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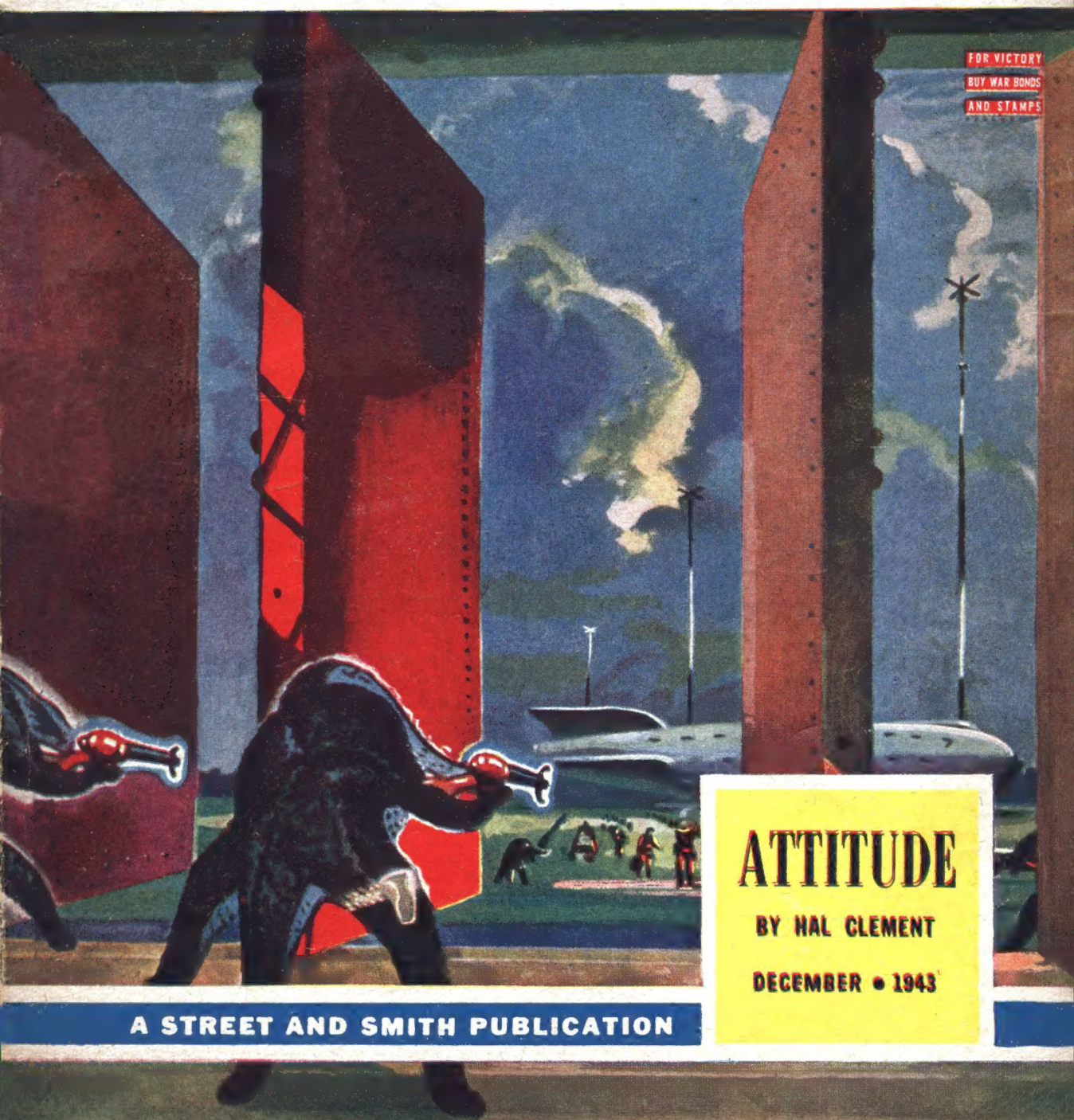

ATTITUDE

BY HAL CLEMENT

DECEMBER • 1943

A STREET AND SMITH PUBLICATION

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DECEMBER 1943

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All stories in this magazine are fiction. No actual persons are designated either by name or character. Any similarity is coincidental

ATTITUDE

By HAL CLEMENT

Their captors had a very curious system, a very curious motivation. The captives were allowed to—even encouraged to—build devices to bring about their escape. Only at the last moment, mysteriously, the captors always stopped them—

DR. LITTLE woke up abruptly, with a distinct sensation of having just stepped over a precipice. His eyes flew open and were greeted by the sight of a copper-colored metal ceiling a few feet above; it took him several seconds to realize that it was keeping its distance, and that he was not falling either toward or away from it. When he did, a grimace of disgust flickered across his face; he had lived and slept through enough days and nights in interstellar space to be accustomed to weightlessness. He had no business waking up like a cadet on his first flight, grasping for the nearest support—he had no business waking up at all, in these surroundings! He shook his head; his mind seemed to be working on slow time, and his pulse, as he suddenly realized as the pounding in his temples forced itself on his awareness, must be well over a hundred.

This was not his room. The metal of the walls was different, the light was different—an orange glow streaming from slender tubes running along the junction of wall and ceiling. He turned his head to take in the rest of the place, and an agonizing barrage of pins and needles shot the length of his body. An attempt to move his arms and legs met with the same result; but he managed to bend his neck enough to discover that he was enveloped to the shoulders in a sacklike affair bearing all the earmarks of a regulation sleeping bag. The number stenciled on the canvas was not his own, however.

In a few minutes he found himself able to turn his head freely and proceeded to take advantage of the fact by examining his surroundings. He found himself in a small chamber, walled completely with the coppery alloy. It was six-sided, like the cells in a beehive; the only opening was a circular hatchway in what Little considered the ceiling—though, in a second-order flight, it might as well have been a floor or wall. There was no furniture of any description. The walls were smooth, lacking even the rings normally present to accommodate the anchoring snaps of a sleeping bag. There was light shining through the grille which covered the hatchway, but from where he was Little could make out no details through the bars.

He began to wriggle his toes and fingers, ignoring as best he could the resulting sensations; and in a few minutes he found himself able to move with little effort. He lay still a few minutes longer, and then unsnapped the top fasteners of the bag. The grille interested him, and he was becoming more and more puzzled as to his whereabouts. He had no recollection of any unusual events; he had been checking over the medical stores, he was sure, but he couldn't recall retiring to his room afterward. What had put him to sleep? And where had he awakened?

He grasped the top of the bag and peeled it off, being careful to keep hold of it. He started to roll it up and paused in astonishment. A cloud of dust, fine as smoke, was oozing from the fibers of cloth with each motion, and hanging about the bag like an atmosphere. He sniffed at it cautiously and started coughing; the stuff was dry, and tickled his throat unpleasantly. There could be only one explanation; the bag had been drifting in open space for a length of time sufficient to evaporate every trace of moisture from its fibers. He unrolled it again and looked at the stenciled number —GOA-III-NA12-422. The first three groups confirmed his original belief that the bag had belonged to the *Gomeisa*; the last was a personal number indicating the identity of the former owner, but Little could not remember whose number it was.

The fact that it had been exposed to the void was not reassuring.

Dismissing that phase of the problem for the moment, the doctor rolled the bag into a tight bundle. He was drifting weightless midway between ceiling and floor; almost in the center of the room; the hatchway was in one of the six corners of the ceiling. Little hurled the bundle in the opposite direction. It struck the far corner and rebounded without much energy; air friction brought it to a halt a few feet from the wall. The doctor drifted more slowly in the direction of the grating. His throw had been accurate enough to send him within reach of it; he caught hold of one of the bars and drew himself as close as possible.

Any lingering doubt that might have remained in his still befuddled brain as to whether or not he were still on board the *Gomeisa* was driven away as he caught his first glimpse through the grille. It opened—or would have opened had it been unlocked—onto a corridor which extended in two directions as far as the doctor's limited view could reach. The hallway was about thirty feet square, but there its orthodox characteristics terminated. It had been built with a sublime disregard for any possible preferred "up" or "down" direction. Hatches opened into all four sides; those opposite Little's station were circular, like his own, while those in the "side" walls were rectangular. From a point beside each opening, a solidly braced metal ladder extended to the center of the corridor, where it joined a heavy central pillar plentifully supplied with grips for climbing. Everything was made of the copperlike material, and the only light came from the orange-glow tubes set in the corners of the corridor.

Dr. Little maintained his position for several minutes, looking and listening; but no sound reached his ears, and he could perceive nothing through the gratings which covered the other hatchways. He also gave a few moments' attention to the lock on his own grating, which evidently was operated from either side: but it was designed to be opened by a complicated key, and the doctor had no instruments for examining its interior. With a sigh he hooked one arm about a bar of the grating and relaxed, trying to reason out the chain of events which had led up to these pecular circumstances.

The *Gomeisa* had been a heavy cruiser, quite capable of putting up a stiff defense to any conceivable attack. Certainly no assault could have been so sudden and complete that the enemy would be in a position to use hand weapons on the crew before an alarm was raised—the idea was absurd; and fixed mount projectors of any type would have left more of a mark on the doctor than he could find at this moment. Furthermore, the ship had been, at the last time of which Little had clear recollection, crossing the relatively empty gulf between the Galaxy proper and the Greater Megallanic Cloud—a most unpropitious place for a surprise attack. The star density in that region is of the order of one per eight thousand cubic parsecs, leaving a practically clear field for detector operations. No, an attack did not seem possible; and yet Little had been deprived of consciousness without warning, had been removed from the *Gomeisa* in that state, and had awakened within a sleeping bag which showed too plainly the fact that part, at least, of the cruiser had been open to space for some time.

Was he in a base on some planet of one of those few stars of the "desert" or in some ship of unheard-of design? His weightlessness disposed of the first idea before it was formulated; and the doctor glanced at his belt. Through the glass window in its case, he could see the filament of his personal equalizer glowing faintly; he was in a ship, in second-order flight, and the little device had automatically taken on the task of balancing the drive forces which would, without it, act unequally on each element in his body. As a further check, he felt in his pocket and drew out two coins, one of copper and one of silver. He held them nearly together some distance from his body, released them carefully so as not to give them velocities of their own, and withdrew his hand. Deprived of the equalizer field, they began to drift slowly in a direction parallel to the corridor, the copper bit moving at a barely perceptible crawl, the silver rapidly gaining. The corridor, then, was parallel to the ship's line of flight; and the coins had fallen forward, since the silver was more susceptible to the driving field action.

Little pushed off from the ceiling and retrieved the coins, restoring them to his otherwise empty pocket. He had not been carrying instruments or weapons, and had no means of telling whether or not he had been searched while unconscious. Nothing was missing, but he had possessed nothing worth taking. The fact that he was locked in might

be taken to indicate that he was a prisoner, and prisoners are customarily relieved of any possessions which proved helpful in an escape. Only beings who had had contact with humanity would logically be expected to identify which of the numerous gadgets carried by the average man are weapons, but the design of this craft bore no resemblance to that of any race with which Little was acquainted. He still possessed his wrist watch and mechanical pencil, so the doctor found himself unable to decide even the nature of his captors, far less their intentions.

Possibly he would find out something when —and if—he was fed. He realized suddenly that he was both hungry and thirsty. He had been unconscious long enough for his watch to run down.

Little's pulse had dropped to somewhere near normal, he noticed, as he drifted beside the hatch. He wondered again what had knocked him out without leaving any mark or causing some sensation; then gave up this line of speculation in favour of the more immediate one advocated by his empty stomach. He fell asleep again before he reached any solution. He dreamed that someone had moved Rigel to the other side of the Galaxy, and the navigator couldn't find his way home. Very silly, he thought, and went on dreaming it.

A gonglike note, as penetrating as though his own skull had been used as the bell, woke him the second time. He was alert at once, and instantly perceived the green, translucent sphere suspended a few feet away. For a moment he thought it might be one of his captors; then his nose told him differently. It was ordinary lime juice, as carried by practically every Earth cruiser. A moment's search served to locate, beside the hatchway, the fine nozzle through which the liquid had been impelled. The doctor had no drinking tube, but he had long since mastered the trick of using his tongue in such circumstances without allowing any other part of his face to touch the liquid. It was a standard joke to confront recruits, on their first free flight, with the same problem. If nose or cheek touched the sphere, surface tension did the rest.

Little returned to the door and took up what he intended to be a permanent station there. He was waiting partly for some sign of human beings, partly for evidence of his captors, and, more and more as time wore on, for some trace of solid food. He waited in vain for all three. At intervals, a pint or so of lime juice came through the jet and formed a globe in the air beside it; nothing else. Little had always liked the stuff, but his opinion was slowly changing as more and more of it was forced on him. It was all there was to drink, and the air seemed to be rather dry; at any rate, he got frightfully thirsty at what seemed unusually short intervals.

He wound his watch and discovered that the "feedings" came at intervals of a little over four hours. He had plenty of chance to make observations, and nothing else to observe; it was not long before he was able to predict within a few seconds the arrival of another drink. Later, he wished he hadn't figured it out; the last five or ten minutes of each wait were characterized by an almost agonizing thirst, none the less painful for being purely mental. Sometimes he slept, but he was always awake at the zero minute.

With nothing to occupy his mind but fruitless speculation, it is not surprising that he lost all track of the number of feedings. He knew only that he had slept a large number of times, had become deathly sick of lime juice, and was beginning to suffer severely from the lack of other food, when a faint suggestion of weight manifested itself. He looked at his equalizer the instant he noticed the situation and found it dark. The ship had cut its second-order converters, and was applying a very slight first-order acceleration in its original line of flight—the barely perceptible weight was directed toward what Little had found to be the stern. Its direction changed by a few degrees on several occasions, but was retored each time in a few seconds. The intensity remained constant, as nearly as Little could tell, for several hours.

Then it increased, smoothly but swiftly, to a value only slightly below that of Earthly gravity. The alterations in direction became more frequent, but never sudden or violent enough to throw Little off his feet—he was now standing on the rear wall, which had become the flood. Evidently the ship's pilot, organic or mechanical, well deserved the name. For nearly half an hour by the watch, conditions remained thus; then the drive was eased through an arc of ninety degrees, the wall containing the hatchway once more became the ceiling, and within a few minutes the faintest of tremors was perceptible through the immense hull and the direction of gravity became constant. If this indicated

a landing, Little mentally took off his hat to the entity at the controls.

The doctor found himself badly placed for observation. The hatch was about four feet above the highest point he could reach, and even jumping was not quite sufficient to give him a hold on the bars. He estimated that he had nearly all of his normal hundred and ninety pounds Earth weight, and lack of proper food for the last several days had markedly impaired his physical powers. It was worse than tantalizing; for suddenly, for the first time since he had regained consciousness in this strange spot, he heard sounds from outside. They were distorted by echoes, sounding and reverberating along the corridor outside, and evidently originated at a considerable distance, but they were definitely and unmistakably the voices of human beings.

For minutes the doctor waited. The voices came no nearer, but on the other hand they did not go any farther away. He called out, but apparently the group was too large and making too much noise of its own to hear him. The chatter went on. No words were distinguishable, but there was a prevailing overtone of excitement that not even the metallic echoes of the great hull could cover. Little listened, and kept his eyes fixed on the hatchway.

He heard nothing approach, but suddenly there was a faint click as the lock opened. The grille swung sharply inward until it was perpendicular to the wall in which it was set; then the side bars of its frame telescoped outward until they clicked against the floor. The crossbars separated simultaneously, still maintaining equal distances from each other, and a moment after the hatch had opened a metal ladder extended from it to the floor of the room. It took close examination to see the telescopic joints just below each rung. The metal tubing must be paper-thin, Little thought, to permit such construction.

The doctor set foot on the ladder without hesitation. Presumably, his captors were above, and wanted him to leave the room in which he was imprisoned. In this wish he concurred heartily; he was too hungry to object effectively, anyway. He made his way up the ladder to the corridor, forcing his shoulders through the narrow opening. The human voices were still audible, but they faded into the background of his attention as he examined the beings grouped around the hatch.

There were five of them. They bore some resemblance to the nonhumans of Tau Ceti's first planet, having evidently evolved from a radially symmetric, starfishlike form to a somewhat more specialized type with differentiated locomotive and prehensile appendages. They were five-limbed and headless, with a spread of about eight feet. The bodies were nearly spherical; and if the arms had been only a little thicker at the base it would have been impossible to tell where body left off and arm began. The tube feet of the Terrestrial starfish were represented by a cluster of pencil-thick tendrils near the tip of each arm and leg—the distinction between these evidently lying in the fact that three of the appendages were slightly thicker and much blunter at the tips than the two which served as arms. The tendrils on the "legs" were shorter and stubbier, as well. The bodies, and the appendages nearly to their tips, were covered with a mat of spines, each several inches in length, lying for the most part nearly flat against the skin. These either grew naturally, or had been combed away from the central mouth and the five double-pupiled eyes situated between the limb junctions.

The beings wore metal mesh belts twined into the spines on their legs, and these supported cases for what were probably tools and weapons. Their "hands" were empty; evidently they did not fear an attempted escape or attack on the doctor's part. They made no sound except for the dry rustle of their spiny armor as they moved. In silence they closed in around Little, while one waved his flexible arms toward one end of the passageway. A gentle shove from behind, as the doctor faced in the indicated direction, transmitted the necessary command, and the group marched toward the bow. Two of the silent things stalked in front, two brought up the rear; and at the first opportunity, the other swarmed up one of the radial ladders and continued his journey directly over Little's head, swinging along by the handholds on the central beam.

As they advanced, the voices from ahead grew slowly louder. Occasional words were now distinguishable. The speakers, however, were much farther away than the sound of their voices suggested, since the metal-walled corridor carried the sounds well if not faithfully. Nearly three hundred yards from Little's cell, a vertical shaft of the same dimensions as the corridor interrupted the latter. The voices were coming from

below. Without hesitation, the escort swung over the lip of the shaft and started down the ladder which took up its full width; Little followed. On the way, he got some idea of the size of the ship he was in. Looking up, he saw the mouths of two other corridors entering the shaft above the one he had traversed; at the level of the second, another hallway joined it from the side. Evidently he was not near the center line of the craft; there were at least two, and possibly three, tiers of longitudinal corridors. He had already seen along one of those corridors; the ship must be over fifteen hundred feet in length. Four vessels the size of the *Gomeisa* could have used the immense hull for a hangar, and left plenty of elbow room for the servicing crews.

Below him, the shaft debouched into a chamber whose walls were not visible from Little's position. His eyes, however, which had become exceedingly tired of the endless orange radiance which formed the ship's only illumination, were gladdened at the sight of what was unquestionably daylight leaking up from the room. As he descended, two of the walls became visible—the shaft opened near one corner—and in one of them he finally saw an air lock, with both valves open. He went hastily down the remaining few feet and stopped as he touched the floor. His gaze took in on the instant the twenty-yard square chamber, which seemed to occupy a slight outcrop of the hull, and stopped at the corner farthest from the air lock. Penned in that corner by a line of the starfish were thirty-eight beings; and Little needed no second glance to identify the crew of the *Gomeisa*. They recognized him simultaneously; the chatter stopped, to be replaced by a moment's silence and then a shout of "Doc!" from nearly two score throats. Little stared, then strode forward and through the line of guards, which opened for him. A moment later he was undergoing a process of handshaking and back-slapping that made him wonder. He didn't think he had been *that* popular.

Young Captain Albee was the first to speak coherently.

"It's good to see you again, sir. Everyone but you was accounted for, and we'd begun to think they must have filed you away in formaldehyde for future reference. Where were you?"

"You mean I was the only one favored with solitary confinement?" asked Little. "I woke up in a cell upstairs, about two thirds of the way back, with less company than Jonah. I could see several other sets of bars from my stateroom door, but there was nothing behind any of them. I haven't seen or heard any living creature but myself since then. I can't even remember leaving, or being removed from the *Gomeisa*. Does anyone know what happened?"

"How is it that you don't?" asked Albee. "We were attacked; we had a fight, of a sort. Did you sleep through it? That doesn't seem possible."

"I did, apparently. Give me the story."

"There's not much to give. I was about to go off watch when the detectors picked up a lump that seemed highly magnetic, and something over eighty million tons mass. We hove to, and came alongside it while Tine took a couple of pictures of the Galaxy and the Cloud so that we could find it again. I sent out four men to take samples, and the instant the outer door was opened these things"—he jerked his head toward the silent guards—"froze it that way with a jet of water on the hinge and jamb. They were too close to use the heavy projectors, and we still had no idea there was a ship inside the meteoric stuff. They were in spacesuits, and got into the lock before we could do anything. By the time we had our armor on they had burned down the inner lock door and were all through the ship. The hand-to-hand fighting was shameful; I thought I knew all the football tricks going, and I'd taught most of them to the boys, but they had every last one of us pinned down before things could get under way. I never saw anything like it.

"I still can't understand what knocked you out. They used no weapons—that annoyed me—and if you didn't put a suit on yourself I don't see how you lived when they opened up your room. The air was gone before they started going over the ship."

"I think I get it," said Little slowly. "Geletane. Four cylinders of it. Did you broadcast a general landing warning when you cut the second-order to examine that phony Bonanza? You didn't, of course, since we weren't in a gravity field of any strength. And the 'meteor' was magnetic, which made no difference to our berylium hull, but made plenty to the steel geletane cylinders, one of which I had unclamped for a pressure test and had left in the tester. I went on about my business, and the field yanked the cylinder out of the tester and against the wall. It didn't make enough noise to attract my

attention, because I was in the next room. With the door open. And the valve cracked just a trifle—just enough. I didn't need a suit when these starfish opened my room; I must have been as stiff as a frame member. I had all the symptoms of recovery from suspended animation when I woke up, too, but I never thought of interpreting them that way. The next ship I'm in, see if I don't get them to rig up an automatic alarm to tell what the second-order fields are doing—"

"You might also put your geletane cylinders back in the clamps when, and if, this happy state of affairs eventuates," remarked Goldthwaite, the gloomy technical sergeant. "May I ask what happens now, captain?"

"I'm afraid it isn't up to me, Goldy," returned Albee. "But I don't suppose they plan to keep us in this corner indefinitely.

Probably they didn't, but Albee was beginning to doubt his own statement before anything else happened. The sun had risen so that it was no longer shining directly into the port, and the great chamber had grown darker as the shadow of the vast interstellar flier crept down and away from its outer wall, when a new party came through the air lock from outside. Two of the pentapods came first, and came to a halt on either side of the inner door; after them crept painfully the long, many-legged, gorgeously furred body of a Vegan. Its antennae were laid along its back, blending with the black and yellow stripes; the tiny, heavily lidded eyes opened wide in the effort to see in what, to the native of the blue star, was nearly total darkness. The line of guards penning in the Earthmen opened and formed a double-walled lane between humans and Vegan.

Albee stepped forward, and at the same moment the interior lights of the chamber flashed on. The Vegan relaxed for a moment as its eyes readjusted themselves; then its antennae snapped erect and began

to sway slowly in the simple patterns of the sign language of its race.

"I assume that some of you, at least, understand me," it said. "Our captors, having learned a little of my language in the months I have spent here, hope to save themselves trouble by using me as an interpreter. Do you wish to acknowledge acquaintance with my speech, or do you think it better to act as though our races had never encountered each other? I was not captured near my home planet, so you might get away with such an act."

Most of the Earthmen had some knowledge of Vegan speech—the two systems are near neighbors, and enjoy lively commercial relations—and all looked to Albee for a decision. He wasted little time in thought; it was evident that they would be better off in communication with their captors than otherwise.

"We might as well talk," he answered, forming the signs as well as he could with his arms. "We should like to find out all you can tell us about these creatures, and it is unlikely that we would be given the chance to communicate secretly with you. Do you know where we are, and can you tell us anything about this planet and its people?"

"I know very little," was the answer. "I believe this world is somewhere in the Cloud, because the only time one of us was ever outside the fort at night he could see the Galaxy. Neither I nor my companions can tell you anything about the planet's own characteristics, for we have been kept inside the base which these creatures have established here ever since our capture. We move too slowly in this gravity to escape from them, and, anyway, the sun has not sufficient ultraviolet light to keep us alive. Our captors, we are sure, are not natives of the planet; they seldom venture outside the walls themselves, and always return before nightfall. Furthermore, they live on provisions brought by their interstellar ships, rather than native food.

"They have not told us the reason for our capture. They allow us to prepare everything we need for existence and comfort, but every time we try to divert supplies to the production of weapons, they seem to know it. They let us nearly finish, and then take it away from us. They never get angry at our attempts, either. We don't understand them."

"If they are so careful of your well being, why do they try to drive us crazy on a steady diet of lime juice?" interrupted Little.

"I could not say; but I will ask, if you wish," returned the Vegan. He swung his fusiform body laboriously around until he was facing one of the creatures who had accompanied him to the ship, and began semaphoring the question. The men watched silently; those who had not understood the preceding conversation were given the gist of it in brief whispers by their fellows. Little had not had a chance to ask if the others had been fed as he had been; their silent but intense interest in the answer to his question indicated that they had. The chronic slowness of Vegan communication rendered them all the more impatient to know the reason, as the black and yellow creature solemnly waved at the motionless pentapod.

There was a brief pause before the latter began to answer. When it did, the Earthman understood why an interpreter was necessary, even though both sides knew the same language. The arms of the creature were flexible enough in front-to-rear motion, as are human fingers; but their relatively great width hampered them in side-to-side waves, and put them at a severe disadvantage in using the Vegan language. The Vegan himself must have had difficulty in comprehending; the Earthman could not make out a single gesture.

Finally the interpreter turned back to the human listeners and reported the result of his questioning:

"The green liquid is all that our captors found in the canteens of your space armor. Since there was a large supply of it on your ship, they assumed it was the principal constituent of your diet. They have, however, salvaged practically all of the contents of your vessel, and you will be allowed shortly to obtain your foodstuffs, cooking equipment, and personal belongings, with the natural exception of weapons. I might add, from my experience, that their unfamiliarity with your weapons will not help you much if you attempt to smuggle any from the stores. We never could get away with it."

"What surprises me," remarked Albee in English, "is that we are allowed at the supplies at all. These creatures must be extremely confident in their own abilities to take a chance."

"From what you told me of the hand-to-hand fighting, such confidence may be justified," remarked Little with a grin. "Didn't you say that they more or less wiped up the floor with the boys?"

"True," admitted the captain, "but there's no need to rub it in. Why are they so stuck up about it?"

"Stuck up? I was getting a strong impression that, as a race, they must be unusually modest." Albee stared at the doctor, but could not get him to amplify the remark. The Vegan interrupted further conversation, attracting their attention with a flourish of its long antennae.

"I am told that your supplies have been unloaded through another port, and are lying on the ground outside the fort. You are to accompany me and the guards to the pile, and take all the food you wish—you may make several trips, if necessary, to get it all to your quarters in the fort."

"Where is this fort, in relation to the ship?" asked Albee. "What sort of land is around it?"

"The ship is lying parallel to the rear of the fort. In front of the ship the ground wall of the fort, about two hundred yards from it. This air lock is near the nose of the ship, and almost opposite the main valves is level for about a quarter of a mile, then dips down into what seems to be a heavily forested river valley. I don't know what lies beyond, in that direction; this sunlight is too dim for me to make out the details of objects more than a mile or two distant. I do get the impression of hills or mountains—you will be able to see for yourselves, outside. Your eyes are adapted to this light.

"In the other direction, toward the stern, the level plain extends as far as I can see, without any cover. Anyway, you'd be between the ship and the fort for the first five hundred yards, if you went that way, and could easily be cornered. I warn you again that these creatures will outguess you, but—good luck. I've told you all I know."

"I guess we might as well go along and get our stuff, then," remarked Albee to his crew. "Don't do anything rash without orders. We'll wait until we see how the supplies are arranged. *Maybe* we'll have to move some apparatus to get at the food."

The black bodies of the guards had ringed them, almost statuesque in their motionlessness, during the conversation. As the Vegan concluded his speech, he had turned toward the lock; Albee had spoken as the men began to follow. The air of the planet was evidently similar to that of Earth, Vego Five, and the home planet of the pentapods, since both valves of the air lock were open. It had the fresh-air smell which the filtered atmosphere of a spaceship always seems to lack, and the men almost unconsciously squared their shoulders and expanded their chests as they passed down the ramp in the wake of the heavily moving Vegan. The scene before them caught all eyes; the interpreter's description had been correct, but inadequate.

The hull of the interstellar cruiser curved high above their heads. The lock chamber occupied a relatively tiny gondola that projected far enough, from its location well to one side of the keel, to touch the ground. The outside of the vessel gleamed with a brilliant silvery luster, in contrast to the coppery glow of the interior. The fort, directly in front of them, was an imposing structure of stone composition half a mile in length and two hundred feet high on the side facing them. The walls were smoothly polished, and completely lacking in windows.

To the left, beyond the nose of the craft, the level meadow continued for several hundred yards, and then dipped abruptly downward. As the Vegan had intimated, the background was filled by a range of rugged-looking mountains, the nearest several miles away. The sun was now nearly overhead, thereby robbing the landscape of the shadows that would have given the Earthman a better idea of its relief. Albee wasted little time looking for what he wouldn't be able to see; he strode on toward the great gate of the fort. In front of the portals were several large heaps of articles, and even at this distance some of them could be recognized as pieces of equipment from the unfortunate *Gomeisa*. The guards closed around the group of human beings and proceeded at the pace set by the captain, leaving the Vegan prisoner to follow at his own speed.

It was evident that a thorough job of looting had been done on the Terrestrial warship. Food and medical supplies, bunks, kitchen equipment, blankets and miscellaneous items of field apparatus were included in the half dozen heaps laid out beneath the glistening black walls. Mixed in with the rest were hand tools and weapons, and Albee, in spite of the Vegan's warning, began promptly to make plans. At his orders, each of the men dragged a shoulder pack out of one of the piles and began filling it with containers of food and drink. The pile of lime-juice bottles was pointedly ignored until Albee, glancing at it, noticed that one case of bottles was not green in color. He went over for a closer look, then extracted

one of the plastic containers, opened it and sniffed. His voice, as he turned to the watching men, was just a little louder than usual:

"Would anyone know where they found this stuff?" His eyes wandered over the faces of the crew. It was Sergeant Goldthwaite who finally answered, hesitantly.

"They *might* have looked between the bulkheads at the cap end of the storage room, cap'n. It was pretty cool there, and seemed like a good place—"

"Not too easy to visit often, in flight," remarked the captain quizzically.

"I never visited it, sir—you can see it hasn't been touched. But you said we would probably touch at Ardome, and I was thinking it might be possible to get rid of it there."

"It probably would. But they have good customs inspectors, and war vessels aren't immune to search. I shudder to think of what would have happened to our reputation if we had made Ardome. Consider yourself responsible for this stuff."

The sergeant gulped. The case of liquor weighed eighty pounds, and could not possibly be crammed into a shoulder pack. He realized gloomly that the captain had inflicted about the only possible punishment, under the circumstances. He put five of the bottles into his pack and began a series of experiments to find out which way his arms went most easily around the case. A small group of pentapods regarded the struggle with interest, their spines waving slowly like a field of wheat in a breeze.

Albee watched, too, for a moment; then he went on, without altering the tone of his words:

"Most of you should have a decent supply of food by now. This planet probably has good water, since the vegetation and clouds appear normal. We should be able to live here without the aid of our generous captors, but we may have some difficulty in avoiding their well-meant ministration. The Vegan said his people had never been able to fool these pincushions into letting them make or steal a weapon. Remembering that, use every caution in carrying out the orders I am about to give.

"When I have stopped talking, each of you count thirty, slowly, meanwhile working your way toward the handiest tool or weapon in the neighborhood. When you reach thirty, dive for the object of your choice and do your best to get to that forest. You have all, except the doctor, had some experience of the rough-and-tumble tactics of these creatures; the problem, I should say, is to get past them without a fight and into the open. I think we can outrun, on the level, any invertebrate alive. If someone is caught, don't stay to help him; right now, I want to get at least a small crew away from here, where we can work out at our leisure rescue plans for the unlucky ones. Don't all try to get guns; we'll find cutting tools just as useful in the woods. You may start counting."

Without haste, Albee counted over the contents of his pack, swung it to his shoulders. The guards, spines twitching slowly, watched. Reiser, the senior navigator, was helping one of Goldthwaite's engineers drag the ship's electric stove from a pile which chanced also to contain several ion pistols. Little picked up and tested briefly a hand flash, conscious of the fact that guards were watching him closely. The action had some purpose; the flash was almost exactly similar to the pistols. He tightened the straps of his own pack—and someone reached the count of thirty. Albee had chosen that number to give the men time enough to prepare, but not enough to get very far out of pace in the counting.

Almost as one, the human beings turned and sprinted for the bow of the warship. Almost simultaneously, the guards went into action, each singling out a man and going to work. Little, who had not experienced the tactics of the creatures, managed to avoid them for perhaps five yards; then one of them twined its tendrils about his wrist and literally climbed up onto his back. A moment later, the doctor was face down on the grass, arms and legs held motionless in the grip of the clumsy-looking, stubby limbs. The spines of his captor were not stiff enough to penetrate clothing or skin, but their pressure on the back of his neck was unpleasant. He managed to turn his head sufficiently to see what was going on.

Four men, who had been at the pile nearest the forest, had moved fast enough to avoid contact with their guards. They were now running rapidly toward the declivity; none of the creatures was in pursuit. Albee and a dozen others were practically clear, but one of these was pulled down as Little watched. One man found himself in a relatively clear space and made a dash. Guards closed in from either side, but realized apparently that they were not fast enough to corner the fellow. They turned

back to other prey, and the runner was allowed to escape.

Goldthwaite had been in a bad position, with almost the whole group to fight through on his way to the woods. Apparently he never thought of disobeying orders, and going the other way. He dropped the case he had been trying to lift, seized a bottle from it with each hand and headed into the mêlée. Curiously enough, he was the only one using weapons; the guard, festooned with implements snapped to their leg belts, fought with their bare "hands," and the men all ignored their guns and knives in the effort to run. Most of the pentapods at the sergeant's end of the group were engaged, and he got nearly halfway through the group before he was forced to use his clubs.

Then a guard saw him and closed in. Goldthwaite was handicapped by the creature's lack of a head, but he swung anyway. The blow landed between the two upper limbs, just above one eye. It didn't seem to bother the pentapod, whose flexible legs absorbed most of the shock, and the tough plastic of the bottle remained unbroken: but the stopper, urged by interior pressure and probably not closed tightly enough—it may have been the bottle investigated by the captain—blew out, soaking the sergeant's sleeve and jacket with liquor. This particular fluid had some of the characteristics of Earthly champagne, and had been considerably shaken up.

Another of its qualities was odor. This, like the taste of Roquefort, required a period of conditioning before one could become fond of it; and this may have been the reason that the guard fell back for a moment as the liquid foamed out. It is more likely, however, that he was merely startled to find an object his people had decided was harmless suddenly exhibit the characteristics of a projectile weapon. Whatever the reason, he hesitated a split second before pressing the attack; and in that moment the sergeant was past.

Ahead of him, three or four more guards —all who remained unoccupied—converged to meet him. Without waiting for them to charge, Goldthwaite swung the other bottle a few times and hurled it into their midst. He was a man quick to profit by experience. Unfortunately so were the guards. They saw the liquid which had soaked into the sergeant's clothes, and needed no further assurance that it was harmless They paid no attention to the flying bottle until it landed.

This flask was stoppered more tightly and did not blow out. The pentapods, who had either seen the behavior of the first bottle or had been told of it, decided that the latest arrival was a different sort of weapon and prudently changed course, avoiding the spot where it lay, and the sergeant, with so such scrupples, passed over it like a racehorse. It was several seconds before the guards overcame their nervousness over this new form of delayed-action bomb, and before they could circle around it, Goldthwaite was well out of reach across the plateau. By that time the acton was over.

Albee had gotten away with about a dozen men. One of these had escaped through the co-operation of the Vegan, who, unable to run himself, had tripped up with an antenna the only guard in position to catch the man. Some twenty-five human beings lay about on the field, each held down by a single pentapod. Two swarms of the creatures were coming rapidly toward them, one from the ship and one from the fort. These formed a ring about the area, and Little found himself once more free to get to his feet. He did so, the others gathering round him.

All guns had disappeared, it seemed. One of the men had tried to use his when he had been intercepted, but his opponent had relieved him of the weapon before any damage had been done. Evidently the information had been broadcast, for all the other ion pistols had been confiscated, though the very similar flash tubes had not been touched. Injuries were confined to bruises.

Little was beginning to get ideas about his captors—he had, indeed, begun to get them some time since, as his cryptic remark to Albee had indicated. Every action they performed gave evidence of most peculiar motivation and thought processes, evidence which was slowly sifting its way through Little's mind. He continued to let it sift as the men, still ringed by pentapods, began to march toward the fort.

The great outer gate opened into a chamber large enough to hold the entire group with room to spare. It was about fifteen feet high, metal walled, and possessed but two doors—the outer valve and another, smaller, in the opposite wall, giving access to the interior of the structure. As though the room were an air lock, the inner portal was not opened until the outer had shut. Then the group passed into a brilliantly lit corridor, stretching on ahead of them far into the bowels of the fort. Hallways branched from

this at intervals of a few yards, some brightly lighted like the main passage, others in nearly total darkness. They had gone only a short distance when the men were stopped by their escort in front of a small doorway in the left-hand wall.

One of the guards activated a small control in the wall beside the door, causing the latter to slide open. The small chamber disclosed was evidently an elevator car, into which five of the pentapods beckoned an equal number of the men. The door slid to behind them, and several minutes of uneasy silence ensued. Little asked the Vegan if it knew where they were being taken.

"Our quarters are in a superstructure on the roof," gestured the creature. "They may put you there, or on the roof itself. You can live in the open under this sunlight; we need supplementary lighting, both visual and ultraviolet. They have told me nothing. I do not even know whether we will be allowed to communicate any further—though I hope so. My companions and I have long wanted to have someone besides ourselves to talk to."

"I suspect we shall be allowed as much contact as we wish—they may even quarter us in adjoining rooms," remarked Little hesitantly. The Vagan eyed him closely for a moment.

"Ah, you have found a way into their minds, Earthman?" it asked. "I congratulate you. We have never been able to understand their motivation or actions in the slightest degree. It may, of course, be that they think more after your fashion than ours—but that seems unlikely, when your minds and ours are sufficiently alike to agree even on matters of philosophy."

"I am not at all sure I have penetrated their minds," answered Little. "I am still observing, but what I see has so far strengthened the impression I obtained almost at the first. If anything constructive results from my ideas, I will tell, but otherwise I should prefer to wait until I am much more certain of my conclusions."

The return of the elevator interrupted the laborious exchange of ideas. It had been gone many minutes, but the Vegan sign language is much slower than verbal speech, and the two allies had had time for only a few sentences. They watched silently as five more men and their guards entered the car and disappeared. There was little talk in the ensuing wait; most of the beings present were too fully occupied in thinking. One or two of the men exchanged low-voiced comments, but the majority kept their ideas to themselves. The Vegan, of course, was voiceless; and the guards stood about patiently, silent as ever, rock-still except for the slow, almost unceasing, wave of the black, blunt spines. They did not seem even to breathe.

The silence continued while the elevator returned and departed twice more. Its only interruption consisted of occasional faint metallic sounds of indeterminable origin, echoing and re-echoing along the corridors of the vast pile. To Little, they were interesting for the evidence they provided of activity through the place, and therefore of the presence of a very considerable garrison. Nothing was seen to substantiate this surmise, however, although it was possible to view objects at a considerable distance along the well-lighted passage.

The elevator returned for the last time. Little, the few remaining men, and the Vegan entered, accompanied this time by only two of the pentapods, and the upward journey began. The car was lifted by an extremely quiet—or extremely distant—motor; the continuous silence of the place, indeed, was beginning to jar on human nerves. The elevator rose smoothly; there was no sense of motion during the five or six minutes of the journey. Little wondered whether the creatures had some ulterior motive, or were simply economizing on power—if the fort were only two hundred feet high, an elevator journey from ground to roof should take seconds, not minutes. He never discovered the answer.

The car door slid open to reveal another corridor, narrower than the one below. To the right it came to an end twenty yards away where a large circular window allowed the sunlight to enter. Little decided that they must be above the level of the outer wall, since no openings had been visible in it. The wall at this level must be set back some distance, so as to be invisible from a point on the ground near the building.

The party was herded in the opposite direction toward several doors which opened from the hallway. Through a number of these, light even brighter than the daylight was streaming; from others, there emerged only the sound of human voices. The party paused at one of the brightly lighted doorways, and the Vegan turned to Little.

"These are our quarters," telegraphed the

creature. "They have permitted us to set up everything we needed for comfort. I would invite you to enter, but you should first find some means of protecting your skin against the ultraviolet radiators we have arranged. Dark goggles, such as Earthmen usually wear on Vega Five, would also be advisable. I shall tell my friends about you; we will converse again whenever possible. If my ears do not deceive me, your people are quartered along this same corridor, so we can meet freely—as you guessed we might. Farewell." The bulky form turned away and hitched itself through the blue-lit entrance.

The creature's auditory organs had not lied; the human crew was found occupying a dozen of the less strongly illuminated rooms along the corridor. Magill, who as quartermaster was senior officer present, had taken charge and had already begun to organize the group when Little and his companions arrived. One chamber had already been set aside as a storeroom and kitchen, and the food was already being placed therein. When the quartermaster caught sight of Little, he wasted no time in greetings.

"Doctor, I seem to recall that the Vegan said we could make several trips for supplies, if necessary. I wish you'd take a dozen men, try to make these creatures understand what you want, and bring up the rest of the food. Also, Denham wants that stove—he promises a regular meal half an hour after you get it here. Can do?" Little nodded; and the officer told off a dozen men to go with him. The group retraced their steps to the elevator.

Several of the pentapods were loitering at this end of the corridor. They made no objection as the doctor investigated the control beside the elevator door, and finally manipulated it; but two of them entered the car with Little and half of his crew, and accompanied them to the ground level. Little obtained one more bit of information as they started down: the elevator controls were like those of an Earthly automatic car, simply a row of buttons. He indicated the lowest, and made a motion as though to push it, meanwhile looking at one of the guards. This creature came over beside him, and with one of its tendrils touched a stud less than a third of the way down the panel. Little smiled. Evidently the fort was more underground than above, and must be a far larger structure than he had thought. It was nice to know.

They waited at the lower level, while one of them took the car back for the others; then, accompanied by several more of the guards, they went outside. None of the men could discover how the doors of the entrance chamber were manipulated; none of the creatures accompanying them appeared to touch a control of any sort. The piles of supplies and equipment were still in front of the gate; nothing had been touched. Squads of the pentapods were hurrying this way and that around the great ship; some were visible, clinging to nets suspended far overhead against the hull, evidently repairing, cleaning, or inspecting.

A long line of the creatures was passing continually back and forth between one of the ports of the vessel and a small gate, which the men had not previously noticed, in the wall of the fort. They were bearing large crates, which might have contained anything, and various articles of machinery. Little watched them for a moment, then turned his attention to their own supplies.

The men loaded up and returned to the elevator, into which the food was piled. One man started up with the load and the others went back to the piles. This time Little turned his attention to the stove, which the cook had demanded. It had already been worked out of its pile and was awaiting transportation. The doctor first inspected it carefully, however.

It was an extremely versatile piece of equipment. It contained a tiny iron converter of its own, but was also designed to draw power from any normal standard, if desired. Being navy equipment, it also had to be able to work without electric power, if circumstances required precautions against detection; and a tube connection at the back permitted the attachment of a hydrogen or butane tank—there was even a clamp for the tank.

Little saw a rack of three gas tanks standing by a nearby pile, and was smitten with an idea. He detached one of them and fastened it into the stove clamp which, fortunately, it fitted. Four men picked up the stove and carried it inside. The other tanks were removed from the rack and carried after it. They contained, it is needless to say, neither hydrogen nor butane. Little hoped that none of the watching guards had been present at the actual looting of the *Gomeisa*, and knew where those tanks came from. He had tried to act normally while he had fitted the cylinder and given orders to bring the others.

The elevator had not yet returned when they reached its door. The men set their burden down. To Little's surprise, none of the guards had accompanied them—they had deduced, from the weight and clumsiness of the device the men were carrying, that watching them would be superfluous until the machine was set up. Or, at least, so reasoned the doctor. He took advantage of the opportunity to tell the men to be very careful of the cylinders they were carrying. They asked no questions, though each man had a fairly good idea of the reason for the order. They already knew that the atomic converter of the stove was in working order, and that heating gas was, therefore, superfluous.

When the elevator finally arrived, Little ordered the man who had brought it to help the others bring the rest of the food from outside. There was still a good deal of it, and it might as well be brought in, though a large supply had already accumulated in the storeroom. He finished his orders with:

"You're free to try any smuggling you want, but be careful. They already know what an ion gun looks like, and we have been told that they're very good at guessing. We don't know, of course, what articles besides weapons they don't want us to have; so be careful in taking anything you think they might object to. I'm going to take this load up." He slid the door to and pressed the top button.

The same group of guards were waiting at the top. They watched with interest as several men helped the doctor carry the stove to the room which was to serve as the kitchen. There was not too much space left, for food supplies filled all the corners. Little smiled as he saw them—it seemed as though Magill were anticipating a long stay. He was probably justified.

Denham, the cook, grinned as he saw the stove. He had cleared a narrow space for it and fussily superintended the placing. He looked at the gas tank attached to it, but before he could express any surprise, Little spoke. He kept his voice and expression normal, for several pentapods had followed the stove into the room.

"Act as if the tank were just part of the stove, Den," he said, "but use the iron burner. I assure you that the gas won't heat anything."

Denham kept his face expressionless and said, "O.K., doc. Good work." As though nothing unusual were occurring, he began digging supplies from the surrounding heaps, preparing the promised dinner. The doctor sought out Magill, who had just completed the task of assigning men to the rooms.

"Have you found out how this place is ventilated?" asked Little, as soon as he could get the quartermaster's attention.

"Hello, doc. Food in? Yes, we located the ventilators. Ceiling and floor grilles. Too small to admit a pair of human shoulders, even if we got the bars out."

"I didn't mean that, exactly. Do you know if the same system handles the rest of the building? And whether those grilles keep blowing if we open the window in a room?"

"We can find out the answer to the second, anyway. Come along."

The two entered one of the rooms, which had been set aside as a sleeping room for three men. All the chambers on this side of the corridor had transparent ports opening onto the roof; after some juggling, Magill got one open. Little, standing beneath the ceiling inlet, was gratified to feel the breeze die away. He nodded slowly.

"I think we should form the habit of keeping the windows open," he remarked. "Of course, not being too pointed about it. It may get a trifle cool at night, but we can stand that. By the way, I forgot to have the men bring up those sleeping bags: I'll tell them the next time the elevator comes up. Do you think our faithful shadows"—Little nodded toward the two pentapods standing in the doorway—"would object if we went out on the roof? They let us open the window, and we could go out that way, in a pinch. There must be some more regular exit."

"No harm in trying," replied Magill. He led the way into the corridor, the two watchers moving aside for them, and after a moment's hesitation turned left away from the elevator. The guards fell in behind. The room they had been in was the last of those occupied by the Earthmen, and several lightless doorways were passed before the end of the passage was reached. They found it similar in arrangement to the other end, containing a large, transparent panel through which was visible a broad expanse of roof.

Magill, who had opened the window in the room, began to examine the edges of the panel. It proved openable, the control being so high above the floor as to be almost out of reach. The pentapods could, without much effort, reach objects eight feet in the air. The quartermaster, with a little fum-

bling, finally released the catch and pushed the panel open.

The guards made no objection as the men went out on the roof, merely following a few yards behind. This end of the hall opened to the southeast—calling the sunrise point east—away from the ship. From a position a few yards outside the panel, it was evident that the prison quarters occupied a relatively small rectangular pimple near the north corner of the half-mile-square roof. The men turned left again and passed along the side of the protuberance. Some of the crew saw them through the windows, which Magill beckoned them to open. Denham had already opened his, and cooking odors were beginning to pour forth.

Crossing the few yards to the five-foot parapet at the edge of the roof, the men found a series of steps which raised them sufficiently to lean over the two-foot-thick wall. They were facing the forest to which Albee and the others who had escaped had made their dash. From this height they could see down the declivity at its edge, and perceive that a heavy growth of underbrush was present, which would probably seriously impede travel. No sign of the refugees caught the eye.

The bow of the ship protruded from behind the near corner of the structure. Little and Magill moved to this wall and looked down. The line of pentapods was still carrying supplies to the vast ship, whose hull towered well above the level of the two watchers. It hid everything that lay to the northwest. After a few minutes' gaze the officers turned back to the quarters. They were now at the "elevator" end of the superstructure, and found themselves facing the panel which had not yet been opened. Two of the men were visible, watching them from within; and Magill, walking over to the entrance, pointed out the catch which permitted it to open. No outside control was visible.

"The men have come with the rest of the food, sir," said one as soon as the panel opened, "and Denham says that dinner is nearly ready."

"We'll be in shortly," said the quartermaster. "You may tell the men they are free to come out and explore, if they wish."

"I would still like to know if the ventilator intake is on this roof," remarked Little as they walked on. "It must be somewhere, and the wall we saw was perfectly smooth. There doesn't seem to be anything out in the middle of this place, so if it's anywhere, it must be hiding in the shadow of the parapet. Can you see any irregularities near the edges?"

"No," said Magill after straining his eyes in every direction, "I can't. But we're half a mile from two of the walls, and might easily miss such a thing at a much shorter distance. If it's here, one of the men will find it sooner or later. Why do you worry about it, if you want us to use outdoor air directly?"

"I thought it might be a useful item of knowledge," replied Little. "I succeeded in smuggling up my three remaining cylinders of geletane, disguised as part of the stove. I don't suppose there's enough to put the whole garrison out—but still, it would be nice to know their ventilating system."

"Good job, doctor. After we eat we'll find out what else, if anything, the boys succeeded in bringing up, and more or lesss take inventory. Then perhaps we can arrange some plan for getting out of here. I wish we knew what has become of the *Gomeisa*; I don't suppose we could manage the controls on that ship outside." Magill made this remark with such perfect seriousness that Little was forced to grin.

"You may be a little optimistic, Keys. Remember the Vegans, who are far from stupid creatures, have been here for some time and have failed to get to first base to date."

"They are handicapped physically, doc. They can't live for long outside without supplementary ultraviolet sources, and they have to plan with that in mind. Furthermore, this gravity is nearly twice that of Vega Five, and they can't move at any rate better than a crawl."

Little was forced to admit the justice of this argument, but remained, in Magill's opinion, pessimistic. He had developed a healthy respect for their captors, along with a slight comprehension of their motives. The trouble was, the Vegan's description of the way the pentapods seemed to guess the purpose of a device before it was completed did not tie in very well with his theory concerning those motives. More thought was indicated. He indulged in it while Magill steered him back to the prison and dinner.

The meal was good. There was no reason why it shouldn't be, of course, since the cook had all the usual supplies and equipment; but Little was slightly surprised to find himself enjoying dinner while in durance vile

as much as if he were on his own ship. It didn't seem natural. They ate in the hallway, squatted in a circle in front of the kitchen door. The Vegans, whose quarters were directly opposite, watched from their doorways. They also commented from time to time, but were very seldom answered, since both hands are required to speak Vegan. They would probably have felt slighted if one of them—not the one who had acted as interpreter—had not understood some English. He got about two words in every five, and succeeded in keeping his race in the conversation.

The meal concluded, the meeting of the ways and means committee, which consisted of all human beings and Vegans in the neighborhood, was immediately called to order. The presence of nonmembers, though resented, was perforce permitted, and discussion began under the watchful eyes of eight or ten pentapods. Little, rather than Magill, presided.

"The first thing we need to know," he said, "is everything possible about our five-sided friends. The Vegans have been with them longer, and probably know more than we; but owing to the relative slowness of their speech, we will save their contribution until last. You who understand English may translate the substance of our discussion to your fellows if you wish, but we will hold a second meeting afterward and go over everything in your own language, First, then, will anyone who succeeded in smuggling any weapons or probable-contraband tools up here please report? Keep your hands in your pockets and your eyes on me while you do so; there is a high order of probability that our friends are very good at interpreting gestures—even human gestures."

A man directly across the circle from Little raised a hand. The doctor nodded to him.

"When we were loading food, before we made that break, I dropped my testing kit into my pack first of all. I didn't try to cover it up and I concentrated on boxed articles of food afterward to make it look natural." The speaker was one of Goldthwaite's assistants, a tall fellow with the insignia of a technician's mate. Little knew him fairly well. He had been born on Earth but showed plainly a background of several generations on the colony-planet Regulus Six—big bones, dark skin, quick reactions.

"Good work, Dennis. What is in the kit?"

"Pliers, volt-ammeter, about sixty feet of assorted sizes of silver wire, two-thousand-line grating, midget atomic wire-welder, six plano-convex lenses of various focal lengths, support rod and two mirrors to go with them, and a small stroboscope."

"Item, one portable laboratory," remarked Little. "Congratulations. Leo, I suppose you have outdone your brother?"

Leo Dennis, the twin brother of the first speaker, shook his head. "Just an old-fashioned manual razor. I'll start accepting offers tomorrow." Little smiled and fingered his chin.

"You're too late, unless someone brought scissors to start with. Safety razors weren't built to cope with a ten-day growth, more or less. Never mind, we may find a use for it—it's a cutting tool, anyway. Next?"

There was a pause, with everybody looking expectantly at his neighbor. Evidently the total had been reached. Little spoke again.

"Did anybody try to smuggle something and fail?"

"I tried to salvage Goldy's liquor, and had it taken from me," answered another man. "I guess they're firmly convinced it's lethal. I wish them luck in analyzing the stuff—we never could."

"How far did you get before they took it from you?"

"They let me pick up the bottles that were lying around, and put them in the case; half a dozen of them watched me while I did that. But when I started to carry the case toward the gate—of course, that was some job, as Goldy found out—they all walked up and just took it away. They didn't get violent or anything like that."

"Then it wasn't really a case of detected smuggling; you made no effort to mask your real intentions. Is that right?"

"Yes, sir. I don't quite see how any one could hide either that case or the bottles; I was just sort of hoping against hope."

Little nodded and called for more contributions. A gunner responded.

"I found a couple of cases of grenades and stuck several into my pockets. The next thing I knew, one of the starfish was holding my arms, and another taking them out again. He handled them as though he knew what they were."

"I suppose you checked the safeties before you pocketed the bombs?"

"Of course, sir."

Little nodded wearily. "Of course. And that was enough for our admittedly astute friends. I admit it's usually a very good idea

to obey regulations, but there are exceptions to every rule. I think the present circumstances constitute an exception to most of them. Any others?"

Apparently no one else had seen anything he coveted sufficiently to attempt to sneak out of the piles. The doctor didn't care particularly; he believed he had enough data from that source, and an idea was rapidly growing. Unfortunately, the primary principle of that idea required him to learn even more, though not about his captors. Possibly the Vegans could supply the information, but Little was not prepared to bet on it.

Magill closed the discussion by mentioning the anæsthetic which Little had made available, and requesting an early communication of all ideas. The men withdrew into smaller groups, talking in low tones among themselves, and gradually drifted through the doors to their rooms, or out onto the roof. Magill followed to take a small group down again for the sleeping bags.

Little remained with the Vegans. He had a good deal to ask them, and material which could be covered in an hour of verbal conversation would probably take three or four hours of arm-waving. He sat just outside the fan of intense light from one of the doorways, and the creatures formed a semicircle just inside—the door was wide enough for the four of them, since it had been constructed to admit the pentapods. The doctor opened the conversation.

"How long have you been here?" was his first question. It was answered by the individual who had acted as interpreter.

"Since our arrival there have passed about two hundred of the days of this planet. We are not sure just how long they are, but we believe they are about thirty of your hours. We have no idea of the length of time that elapsed between our capture and our arrival at this place, however. We were driving a small private ship on a sightseeing trip to a world which had recently been reported near the galactic center by one of our official exploring vessels, and were near its reported position when we were taken. They simply engulfed us—moved up and dragged our ship into a cargo lock with magnets. We were on their ship a long time before they put us off here and left again, and we were not allowed to obtain any of our belongings except food and ultraviolet lamps until we arrived; so we don't know how long the trip lasted. One of us"—the Vegan indicated the individual—"got up courage enough to venture onto the roof one night and saw what he thinks was the Galaxy; so we believe this world lies in the Cloud. You will be able to tell better for yourselves—you can stand the dark longer than we, and your eyes are better at locating faint details."

"You may be right. We were heading toward the Cloud when we were taken," answered Little. "How freely have you been permitted to move about this fort?"

"We may go almost anywhere above ground level," was the answer. "Some of these watchers"—a supple antenna gestured toward the ever-present guards—"are always with us, and they prevent us from taking the elevators any lower. Then there are a few rooms on the upper levels which are always sealed, and two or three which are open but whose thresholds we are not permitted to cross."

"How do they prevent your entering?"

"They simply get in front of us, and push us back if we persist. They have never used violence on us. They never need to; we are in no position to dispute their wishes. There is no comparison between them and us physically, and we are very much out of our natural environment."

"Have you been able to deduce the nature or purpose of the rooms from which you are barred?"

"We assume that they are control rooms, communication offices, or chart rooms. One of them contains several devices which look like ordinary television screens. Whether they are for long-range use or are merely part of a local system, of course we cannot tell." Little pondered for several moments before speaking again.

"You mentioned constructing several devices to aid in escape, only to have them taken away from you just before they were completed. Could you give me more details on just what happened? What were you doing, and at what stage were you interrupted? How did you expect to get away from the planet?"

"We did not expect to get away. We just wanted to make them go, so we could take over the fort. When we disconnected their tube lights to put in our own, he"—indicating the creature beside him—"managed to retain a sample of the tube. On its walls were absorbed layers of several gases, but neon was the chief component. We had smuggled in the neutrino converters and stabilizers from our ship"—and Keys said

these fellows were helpless, thought Little —"and it occurred to us that we might set up a neon-oxygen reaction which would flood the place with ultraviolet. We had already noticed that they could not stand it any better than you. The half life of the process would have been of the order of twelve hours, which should have driven them out for a period of time ample for our purpose. A neutrino jet of very moderate power, correctly tuned, could easily have catalyzed such a reaction in every light tube in the place. We had built the projector, disguising it as another ultraviolet lamp, and were connecting the converter when about fifty of the guards dived in, took the whole thing away, and ran out before the lamps we already had going could hurt them."

Little heroically forbore to ask the creatures why they had not smuggled in their ship while they were about it and flown away. The Vegans wouldn't have appreciated the humor.

"I believe I understand the purpose of the actions of these creatures," he said. "But some of their characteristics still puzzle me. Their teamwork is perfect, better than that of well-trained human fighters, but if my idea is correct their technical knowledge is inferior to ours. I have already mentioned to my captain their apparent lack of conceit—that is also based on my guess as to their motives in capturing us. One thing, however, I do not understand at all. How do they communicate? I have always been reluctant to fall back on the 'explanation' of telepathy; there are reasons which make me doubt that it can ever be a satisfactory substitute for a language."

The Vegans looked at him for a moment, astonishment reflected in the tenseness of their antennae.

"You do not see how they talk?" signaled one at length. "That is the first and only thing we have been able to appreciate in their entire make-up."

Little leaned forward. "Explain, please," he waved tensely. "That may be the most important thing any of us has yet ascertained."

The Vegans explained at length. Great length. The recital was stretched out by Little's frequent questions, and once or twice delayed by his imperfect comprehension of the Vegan language. The sun was low in the west when the conversation ended, but the doctor had at last what he believed to be a complete mental picture of the habits, thoughts, and nature of the pentapods, and he had more than the glimmerings of a plan which might set the human and Vegan prisoners free once more. He hoped.

He left his nonhuman allies, and sought out Magill. He found him at the western corner of the roof, examining the landscape visible beyond the tail of the spaceship. A couple of pentapods were on hand as usual. Leo Dennis was making himself useful, sketching the western skyline on a pad he carried, with the apparent intention of marking the sunset point. Magill had evidently decided that an assistant navigator should be able to get his own location on a planet's surface as well as in space. Dennis was slightly handicapped by a total lack of instruments, but was doing his best. Little approached the quartermaster.

"Has anything new turned up, Keys?"

The officer shook his head without turning. "The men are all over the roof, to see if there are any ventilator intakes or anything else. One of them pointed out that the lack of superstructure suggested that the roof might be used as a landing place for atmosphere craft, and found some blast marks to back up the idea. No one else has made any worth-while reports. If there are any aircraft, though, I'd like to know where they stow them."

"It might help, though I hope we won't be driven to using them. I suppose the boys have their eyes open for large, probably level-set trapdoors in the roof. But what I wanted to find out was: with whom am I sharing a room?"

"Don't recall, offhand," replied Magill. "It doesn't matter greatly. If there is any one in particular you want—or don't want—to be with, you're at liberty to trade with someone. I told the boys that."

"Thanks. I want to spend some time with the Dennis boys, without making it too obvious. I suppose they're already together. By the way, seeing I'm still a medical officer, has anyone reported sick? The air is just a shade on the thin side, and we've been breathing it long enough for effects to show, if there are going to be any."

Magill shook his head negatively, and Little strolled over to Leo, who had completed his sketch and was trying to mark the position of the sun at five-minute intervals. He was wearing one of the few watches possessed by the party. He was perfectly willing to have his erstwhile roommate re-

placed by the doctor, especially when Little promised work to be done. He agreed to speak to his brother and to Cauley, who had originally been assigned to their room.

"Tell Arthur to bring his pack, with the kit he sneaked along," added the doctor. "We will probably have use for it." Leo nodded, grinning, and resumed his attempts to fix the position of an object, much too bright to view directly, which had an angular breadth on the order of half a degree. He didn't appear discouraged yet.

Little wandered off across the roof, occasionally meeting and speaking to one of the men. Morale seemed to be good, he noted with relief. He had always considered that to be part of the business of a medical officer, since it was, after all, directly reflected in the health of the men.

A motion in the direction of the setting sun caught his eye. He turned to face it and saw a narrow, dazzling crescent low in the western sky, a crescent that rose and grew broader as he watched. The planet had a satellite, like Mars, so close that its period of revolution was less than one of its own days. Little wondered if a body so close to the planet might not prove useful. He filed the thought away for future reference.

The sun set as he watched, and he realized he had been right about the thinness of the air. Darkness shut down almost at once. The moon sprang into brilliance—brilliance that was deceptive, for details on the landscape were almost impossible to make out. Stars, scattered at random over the sky, began to appear; and as the last traces of daylight faded away, there became visible, at first hazily and then clear and definite, the ghostly shape of the Galaxy. Its sprawling spiral arms stretched across a quarter of the sky, the bulk of the system inclined some thirty degrees from the edge-on position—just enough to show off the tracing of the great lanes of dust that divided the arms.

The men began to drift toward the orange glow that shone through the entrance panels and windows of the "penthouse!" They were greeted by the whistle of Denham, who had just completed preparation of another meal It was eaten as the first had been, in the corridor with a silent audience of guards. The men had grown used to the creatures, and were no longer bothered by their presence. The conversation was desultory, except when Arthur Dennis offered to take the place of Denham's helper for the evening. It was the most plausible excuse for entering the kitchen-storeroom, where the packs had been stowed. No one commented, though everybody guessed the reason.

Windows and doors of all rooms were left open, the first because of Little's advice, the second because the pentapods had removed all means of closing the entrances —privacy was impossible, which did not in the least surprise Little. At the conclusion of the meal, he accompanied Leo Dennis to the latter's room, which was near the end of the corridor farthest from the elevator, and waited for the arrival of Arthur. A little investigation solved the secret of turning out the room's tube lights, which darkened the place somewhat, but the light from the corridor was sufficient to move around by.

Arthur entered after about fifteen minutes, carrying three packs under his arms. Two of these he tossed to his brother and the doctor, remarking, "Pillows in one suite, anyway!" The other he retained. The three men rolled up the packs and placed them under the canvas at the heads of their sleeping bags, conscious meanwhile of the never-ending scrutiny from the door; then they leaned back against the wall and relaxed.

The twins had tobacco, and all three smoked as they talked. A remark of Leo's, which opened the conversation, eased Little's mind of one problem which had been bothering him.

"Before we do or say anything else, doc," said the navigator, "please think carefully before you tell us anything. I suppose you found out a good deal from the Vegans, and I wouldn't be surprised to know you have a campaign all mapped out; but I don't want to know more than necessary. I have developed, from what the Vegans said and from what I've seen myself, a very healthy respect for the intuition, or guessing powers, or whatever it is, of our silent watchers. It makes me uncomfortable. And the less I know the more natural I can let myself act. All right?"

"All right; that was my own idea, too," answered the doctor. "I will tell you no more than necessary. In the first place I should, like Magill, like to know our location on this planet and the planet's location in space. That, unquestionably, is your job, Leo. Then I want to get the information to the handiest United base or ship. That's all. I don't believe we could break out of

here, though probably Keys will try. I pin my hope on our broadcasting a message from inside and letting people already outside do the rest."

The brothers nodded. "That's clear enough," said Leo, "and I can probably locate us fairly well if . . . Art, did you say you had a grating in that kit of yours?"

"Yes," was the answer. "Do you need it?"

"Uncertain, but probably. I'll have to identify the local navigation beacon somehow, and its spectrum will be the most outstanding hallmark. Why don't doc and I go outside now and do some star-gazing, while you curl up in your sleeping bag and see if the shadows don't follow us? If they do, you can rummage in the kit without being seen, and come out in a few minutes with the grating and a couple of the lenses you mentioned. If they don't we'll do what we can with the naked eye and come back. Sound?"

"Solid. Be seeing you."

Arthur extinguished the stub of his cigarette, loosened his belt and shirt, and began removing his boots, while Leo and Little rose and went out into the hallway. Pentapods, scattered along the corridor, eyed them as they emerged, but made no move to intercept them. The door opening outside had been left ajar by the Earthmen in their policy of avoiding the use of the building's ventilation system, and the guards were evidently following a policy of noninterference with regard to everything but weapons. The panel was still partly open.

Little pushed it wide, and the two human beings went out onto the roof. To their surprise they were not followed; but both realized that there might already be guards on the roof. They moved out of the path of the light from the door and approached the nearest wall.

The mountains to the northeast were silhouetted against the almost equally dark sky; the forest at their feet was indistinguishable. No glow or spark of light suggested the presence, anywhere in the scene, of the men who had escaped nine hours before, though Little and Dennis strained their eyes looking. Not even a reflection from the river the doctor believed must be present broke the dark expanse.

The sky offered more material for comment. The Galaxy was lower in the west and the moon higher. Dennis, looking at the latter, did some rapid mental arithmetic. It had risen about an hour and a half ago, and would probably reach the zenith in a little more than another hour. Its siderial period, then, must be about eight hours, and its distance, if this world had the same size and mass as Earth, a little over eight thousand miles from the surface. It was now nearly at "first quarter," but its dark side was faintly visible, presumably illuminated by the reflected light of the planet. Somewhat less than four hours after sunset, the satellite should enter the planet's shadow and be eclipsed for about forty minutes, unless its orbit were more highly inclined to that of the planet than appeared to be the case.

Little was looking at the stars, spread over the sky in unfamiliar constellations. "Which of these is the local navigation beacon, and how do you identify it?" he asked. "And why do you pick out one star to call a beacon?"

"It would be possible to obtain our position from any three stars whose location is on the charts," answered Dennis, "but it is much easier, as a rule, to use certain individuals, because tables have been computed for use with them, and they are easier to identify. I don't have the tables with me, of course, but the beacon for this neighborhood and the Galaxy, together, would give me a fairly good idea. We use the brightest available stars for beacons, naturally—Rigel and Deneb in the Solar sector, for example. For navigation in the Larger Cloud we use a slightly different system, which employs two super-giant stars back in the Galaxy and the one local beacon which covers the whole Cloud—S Doradus. It shouldn't be hard to find, even without instruments, since it's a first-magnitude star at a thousand parsecs; but we always like to check the spectrum, if possible. Most beacon stars, of course, are O, B, or M supergiants, but there are usually detectable individual differences which can be picked out by a good instrument. We haven't a good instrument but fortunately S Doradus has a very distinctive spectrum.

Little nodded. "I can see that much. Don't tell me how you reduce the observations to get your position; it would certainly go beyond my mathematical limit, and I don't like to be shown up."

"It's not difficult—elementary spherical trig. If you know what a direction cosine is, you're all right. Matter of fact, that's how positions are indicated—three direction cosines from a given beacon, plus distance. I don't know how we'll get the distance—I can estimate brightness to a tenth of a magnitude, but that may answer to a small

percentage of an awful distance. We usually can triangulate, but not in the Cloud."

"I'll take your word for it," replied the doctor. "Can you see anything that might be your beacon?"

"There's a fairly bright specimen sitting just above the north horizon, that seems to have a tinge of yellow; and there's another right ahead. If Art ever gets here with the lenses and grating I'll test them. I suppose he can't make it, since the dumb chums didn't follow us out here and give him a chance to burrow into the kit."

"He may find a way to do it, anyway," remarked the doctor.

"It would be just like him to try, and lose the kit," was the pessimistic answer.

Even Little was growing discouraged by the time Arthur finally arrived. They had been out nearly an hour, Little amusing himself by strolling along the walls to see whether anything were visible below, and Leo observing the satellite as it approached the zenith. He had already come to the conclusion, from the fact that the sun had set practically "straight down," that they were near the equator of the planet. It now seemed that the moon was in the equatorial plane, since it was rising to a point directly overhead. It was well past first quarter now, but the unlighted crescent was still visible. Leo had just noticed this fact when Arthur's voice interrupted his pondering.

"I assumed you wanted the lenses for a telescope of sorts, and chose accordingly," said the technician. "It took me a long time to work the kit out of the pack and into the sleeping bag because the guards were looking in every two or three minutes. I don't know what will happen when they find me gone."

"I do, you chump," answered Leo. "Two or three of them will drift out here after us, and some more will seize the chance to investigate the pack whose position you changed so often."

"Think so?" asked Arthur. "Here are the lenses and grating. I brought the rod and lens clamps, too, but I'm afraid you'll have to get along without a tube." His brother accepted the assortment and fell to work. The doctor looked on silently. Arthur had brought a light also, and held it on the step which served as a workbench.

Leo, after a moment's thought, discarded one lens and used the other—the one of longer focal length. He clamped this at one end of the rod, with the plane side toward the center. The grating was smaller than the lens, and he clamped it against the plane face of the latter with the excess glass blocked off with paper. Another sheet of paper—a leaf torn from his sketch pad—was clamped to the rod at the focal distance of the lens, completing the crude spectroscope.

He set the instrument on the wall, propping it so that it was pointed toward the northern horizon and one of the stars he had mentioned. He leaned over it, to cut off the moonlight. The other two also leaned forward to see the results.

A little streak of color, narrow as a pencil line, was just visible on the paper screen. Leo brought his eyes as close as he could, striving to perceive the tiny dark gaps that should have existed; but the resolution of the instrument was not sufficient. After a moment's pause, he returned to the original idea, removing the paper and clamping the other lens in normal eyepiece position. This proved successful. He could make out enough to identify both the stars he had counted on as unquestionably sun-type G stars, probably no more than a few parsecs distant, and definitely not the giant he sought.

The navigator began to wear a worried expression. There were several thousand stars visible to the naked eye, and only a few of them were obviously not the object of his search. After a few minutes, however, he began a methodical examination of all the brighter yellow and white stars, one after another. Arthur and the doctor saw that interruption would not be helpful, so they withdrew a few yards and conversed in low tones.

"What will you do if Leo does get our position?" asked the technician. "I suppose you have some idea."

"The idea I have depends almost entirely on you," answered Little. "I have been told that a second-order transmitter is less complicated than an ordinary radio. Could you build one?"

Dennis frowned and hesitated. "If I had all the materials and no interruptions, yes. Here and now, I don't know if the necessary equipment is available, and I'm reasonably sure we wouldn't be allowed to do it, anyway."

"You said there were two atomic tools in your kit, a heater and a stroboscope," said Little. "Would their parts be enough?" Once again Dennis paused to think.

"The welder wouldn't—it's just a converter and a tungsten element. The stroboscope converts with a direct electron current and a variable oscillator and—I believe it could be done. But it wouldn't handle much power, and the range would be nothing to speak of."

"That doesn't matter, as I see it. All I want to know is that you can build a vision transmitter with the material on hand—"

"Wait a minute!" interrupted Arthur. "I didn't say a vision unit. What do you need that for? All I was counting on was voice transmission. That won't be very difficult."

Little shook his head. "Vision or nothing. I don't want to tell you why, for the reason Leo gave. But please, if you don't want me to have to re-design the whole plan, find a way to construct a vision transmitter. And I hate to be too exacting, but I'd like it done before that ship leaves again. I don't know how long they usually stay here, but I notice they're stocking up."

"Sure," groaned Dennis. "Right away. Doc, if it were anyone else I'd know he was crazy, but with you it's only a strong suspicion. I'll try—but Lord knows where I can come by an icon tube."

Little grinned invisibly in the darkness. "The Vegans said they smuggled up a complete neutrino assembly. It was taken away from them later, but it gives you an idea of what can be done."

"They didn't give you an idea of their technique, I suppose? I'm not too proud to learn."

"I didn't ask them. There were guards around. Good luck!"

Little went back to Leo, who was resting his arms. Not a single O class spectrum had yet been picked up by the instrument.

"If I were sure it were there, I wouldn't mind so much," he said, wiping his forehead. "But it's just as likely to be in the daylight half of the sky. I'd rather not have to wait here half of whatever time it takes this world to amble around its sun, just to get a rough idea of where I am."

Little nodded sympathetically—after all, he was the one who wanted their location. "Does the moonlight interfere any?" he asked.

"It did, until I made a rough tube out of paper. It's a little hard to hold together. But speaking of the moon, doc, have you noticed anything strange about it?"

"I wouldn't," answered Little. "Is something wrong? It looks natural to me."

"It doesn't to me. It did right after sunset, when it was a narrow crescent. We could see the rest of it then, but reflection from this planet could have accounted for that. But it doesn't now! The darn thing's nearly full, and you can still see the strip that the sun doesn't reach. This world can't possibly reflect enough light for that, What's lighting it up?"

"I'm afraid it's no use to ask me," said the doctor. "I can guarantee it's not radioactivity, because that much radioactive matter so close would have prevented the existence of life on this world. It would have been burned sterile; we'd probably be dead now ourselves. I don't know any astronomy, but I can tell you all you want to know about gramma-ray burns."

"That occurred to me, too," agreed Leo. "It seems that there must be something, at present invisible to us, shining on that satellite. I think in a few minutes we'll be able to get an idea of where it's shining from, too."

"How?" asked Little and Arthur with one voice.

"The moon should pass into this planet's shadow very shortly," answered Leo. "A lunar eclipse. The satellite must have one every revolution—almost four times a day, I should say. The sun's light will be cut off, except for the fraction scattered by the atmosphere of this world, and we should be able to tell from the shape of the part illuminated by this mystery source, the direction of the source. We'll wait." The other two nodded. Even Little, who was no astronomer, understood the mechanism of an eclipse. The three settled themselves on the broad steps inside the wall.

They had not long to wait. It was about three and a quarter hours after sunset, and the first outlying tentacles of the looming Galaxy were just dipping below the western horizon, when Leo marked the first darkening of the eastern limb of the nearly full moon. It was not like the protracted lunar eclipse of Earth; the satellite was moving far more swiftly, and took less than a minute to travel its own diameter. There was a feeble, preliminary reddening as it plunged into the region illuminated only by air-scattered light; then this was gone, as the little body passed on into the umbra of the planet's shadow.

It should have disappeared. No possible reflection from the planet it circled could have given it a touch of illumination, for it

looked down only on the night side of the world: Yet part of it was still to be seen—a ghostly, dimlit crescent, a little less than half full, its convex side facing *east*. There was no possible question of the nature of the light source. Leo estimated the distance of the moon above the eastern horizon, and the angular breadth of illuminated surface; there was only a small difference.

"It will rise before long," he said. "I'm staying to see. You fellows can go back to sleep if you wish; we've been out over two hours and we'll need some sleep."

"We'll stay," said Little." This gets interesting. Do you think there's another, very bright, moon? Large enough, perhaps, to be habitable?"

Leo shook his head. "I don't believe any possible moon could do that," he said. Arthur nodded in silent agreement, and for many minutes the three sat without speaking as the dimly lit crescent dipped lower toward the eastern horizon. Leo had judged roughly that the eclipse should last about forty minutes.

It had not ended when Arthur pointed silently to the east. A spur of the mountain range whose principal peaks lay to the northeast had become a little clearer, silhouetted against a suddenly brighter patch of sky. The brilliance grew and spread, paling the stars in that quarter of the heavens as though dawn were breaking; and quite suddenly the source rode clear of the concealing hill and presented itself to view. The undulations of the landscape were abruptly visvible, standing out against the long shadows cast by the light of the newcomer, which hung, far brighter than the moon at its best, just above the peaks.

The men looked on in awe. They had seen the mad splendor of the spiraling gas streams hurled forth from binaries like Beta Lyrae; they had driven through the hearts of globular clusters, with giant sums by the myriad on every hand; but somehow the lonely, majestic grandeur of this object was more impressive. A star—too distant to show a perceptible disk—too bright to be gazed at directly, putting to shame the surrounding celestial objects. Even the moon, sliding out of the shadow in an apologetic fashion, no longer seemed bright.

Arthur Dennis was the first to speak. "It gets you, doesn't it? I suppose it's a companion to the sun, or else—"

"Or *else*," said Leo flatly, snatching the spectroscope. The great star was white, with just a suspicion of topaz in its glow, and Leo was prone to jump to conclusions. One glance through the instrument, sweeping it slightly from left to right, was enough. He grinned, removed the eye lens, and replaced the paper screen of the original arrangement, and three heads bent once more to look at the streak of color.

It wasn't a streak this time. A single bright point centered itself directly behind the objective lens, and to either side of this there extended a broken series of dashes—the intense emission bands, bordered on the violet side by relatively sharp dark lines, which characterize what the early astronomers called a "P Cygni" star. The continuous background spectrum was too faint to show; the grating was so coarse that several orders of the spectrum fell on the paper at once.

"And that's your beacon!" remarked Little after a few moments of silence. "Well, it certainly earns the name."

"You can get our location now?" asked Arthur. I should think you wouldn't need to say much but 'Near S Doradus,' from the looks of that thing."

"Wrong, blast it," answered Leo. "When I said I could judge brightness to a tenth of a magnitude, I was thinking of decent stars with visual mags between zero and plus six. For this thing, I don't know whether it's minus five or minus fifteen—whether the blasted thing is three quarters of a parsec or eighty parsecs away. I'll get the direction, though, and maybe I'll find a way to measure the brightness. I'll look after that; you people worry about what to do with it if I get it. Good night."

The dismissal was rather pointed, and Leo turned his full attention to the pad on which he was computing, so Little and Arthur silently retired. So did all but one of the guards who had been watching, invisible in the shadow of the superstructure.

Dr. Little opened his eyes with a start and realized it was full daylight. It had been the first sleep under normal gravity in several weeks, and his body had made the most of it. The other two sleeping bags were empty, but the Dennis brothers were both present. They were by the window, removing a piece of canvas that had apparently been draped across it. Little sat up.

"What are you fellows up to now?" he asked. "Leo, don't you ever sleep?"

"Sure, when necessary. You have been sleeping for twelve hours, doc. Did we wake you up?"

"Twelve hours! No, it was probably my conscience. What's the idea of window curtains? We haven't even a door, so it can't be privacy."

"We were screening out the sunlight Leo didn't want," answered Arthur. "He was trying to get the sun's spectrum, and just wanted a narrow beam through the grating."

"Did you get it?"

"Sure." It was Leo speaking again. "And we found a use for the razor. The edges of the blades are good for making a slit for the beam. This fellow, of course, didn't have anything in that wonderful testing kit that would do. By the way, Art, have you still got the kit, or did our friends take it last night?"

"Someone poked around in it," Arthur answered, "but they left it here. Maybe they thought there was nothing in it that we could put to use."

"I think they would have left it, anyway," remarked the doctor, grinning at the expressions of unbelief on the two faces.

Leo walked over to his brother's sleeping bag and took the kit box from the pack. "You know best, doc. In that case, I'm going to have a look, and find out if there's anything useful that Art forgot to mention—Art, you dope!"

"What's wrong now?" asked the technician, without moving.

"The welder and the stroboscope you spoke of—they're gone! And you said the guards must have decided the stuff was harmless. What do we do now?"

"The welder and stroboscope are in my pockets, and have been since last night. You thought of the stuff's being taken, didn't you? And did you *ever* think of anything without my beating you to it? You worry about your own department; I can take care of mine, I hope." The last phrase was stimulated by an amused glance from the doctor.

They strolled out into the mixed crowd of humans and pentapods in the corridor, and Arthur went over to the kitchen. He appeared to have taken on permanently the job of cook's helper. Little located the quartermaster, and began discussing the day's possibilities. They seemed to be few. Most of the crew were specialists of one sort or another, experts in the fields of knowledge and activity necessary to fly and fight an interstellar cruiser; but one and all were hampered by lack of materials and tools. The only way to get these appeared to be theft, at which the crew of the *Gomeisa* were not specialists. The only advice Little could give was that the men should do their best to smuggle in materials, to the exclusion of other occupations, and any one who had a workable idea should let the others know what he needed to work it. Not very helpful, since everybody already had that idea. It looked as though time would pass rather boringly.

It did. The men wandered more or less freely about the roof and the corridors of the building below, and occasionally went out to the supply piles for material they wanted. To Magill's surprise, but not to Little's, they were allowed to take even pieces of scientific apparatus without interference.

"I don't get it," said the quartermaster when a man reported bringing in a portable atomic melting furnace. "Anyone could see that that was a dangerous tool in the hands of a prisoner. Why do they let us get away with it?"

"To me," answered Little, "that is the least puzzling factor. The treatment we are getting shows that there can be only one reason for our capture—to learn from us. Naturally, we must be allowed access to tools and scientific equipment. Then they watch our efforts to escape, and help themselves to the results of our labor. What is so puzzling about that?"

Magill was silent for several minutes. "Put that way," he said at last, "it's obvious. I don't know why I didn't think of it before. That, I suppose, is why you said they weren't a conceited race—they go to such lengths to take the knowledge of others. But what happens if they're a little slow in taking a weapon away from us?"

"Apparently they are prepared to take that risk. They have succeeded so far with the Vegans, and they have all our standard weapons, you'll note. That ability of theirs to guess the purpose of our actions is our chief bugbear. It's unusual; most of the time it's almost impossible for two races meeting for the first time to understand even each other's standard gestures, let alone natural, unstereotyped face and body motions. But do your best with that in mind."

Little did not say that, with the aid of the information given by the Vegans, he had been able to deduce the reason for the almost telepathic guessing ability of the pentapods; and he did not mention the plan that he and the Dennis brothers were trying to put into operation. If Magill went ahead

with ideas of his own, it would probably occupy much of the attention of their guards. Not that Little wanted it *all* occupied.

The reports of the men who had wandered through the building agreed with the statements of the Vegans—most places were permitted, below ground was not, some rooms were locked, and some were open but the men had been kept out. One room, on the top floor almost directly below the prison quarters, appeared to be a communications office—which was a natural situation, if the roof had originally been used as a landing platform. The purpose of most of the others was not clear. Little did some wandering himself, and personally checked most of the information.

That evening the Vegans ate with the men; their own supplies had given out long before, of course, and they had been living on food supplied by the pentapods. It was evidently harmless, but far from enjoyable, according to the Vegans. Arthur Dennis served the food to them at their doorway, and brought the mess kits back to the kitchen after the meal. The guards usually withdrew some distance while the men were eating; the odors evidently did not appeal to them. Consequently, there was none of the creatures in the kitchen when Arthur brought back the kit. His self-assigned position as cook's helper was becoming constantly more useful, he reflected.

Days in prison tend to be rather boring. Nights are better because one can sleep and forget the boredom for a while; but from this night on Arthur Dennis knew he would sleep very little, though he planned to trade his sleeping bag for one several sizes larger and retire completely into it. He decided to develop the habit of keeping his face partly covered by the canvas flap, and have his companions emulate him to make the action seem more natural. He was jubilant when the others came to the room.

"I have an icon tube, doc," he said from the depths of the sleeping bag. "That's what worried me most. I can build the second-order converter from the stuff I already had, and I can probably dig up enough from the other boys to make the tube connections. It's lucky they let us keep the hand lights. I don't know how I'd put this stuff together in the dark."

"How did you get the tube?" asked Little. "I didn't see you go downstairs all day, and I don't think many of the men knew about the guards' having let a good deal of apparatus by without trouble, so they wouldn't have done it for you."

Arthur grinned in the darkness. "Since I didn't have the Vegan technique we mentioned, I bet one of the Vegans fifty Union credits it couldn't be done—thus implying my doubt of his story of smuggling up a neutrino unit. He slipped it into his mess kit this evening after the meal, and I got it in the kitchen. He was a little touchy about my rudeness, but I apologized this evening and he's cooled off. I pay the bet if and when we reach a Union planet and can get some money." The technician ceased speaking, and the flap fell again across the opening of the bag.

Silence fell throughout the room, broken by the even breathing of two people and the occasional almost inaudible footfalls of the guard outside. Once or twice a shadow fell across the doorway as one of the creatures looked in, but it defeated its own purpose by blocking the light, and saw nothing. Dennis was careful, anyway, and allowed no motion to show through the padded canvas of the sleeping bag.

He was not interrupted that night, and worked for two or three hours before placing the partly completed unit in his kit and going to sleep.

The next morning it occurred to Little that the Vegans might have some idea of the probable length of stay of the ship. After the morning meal he squatted in front of the doorway of their quarters and questioned the creatures.

"They usually remain about ten days," was the answer. "But it is impossible to tell for sure. This is the first time prisoners have been brought since we came. We didn't notice how long they stayed on our arrival —we were too worried about other things.

"How long do they remain away, usually?"

"There is no 'usually' about it; the duration is absolutely unpredictable as far as we can see. Sometimes the ship is gone for only a day, sometimes for several weeks. It is evidently not a patrol cruiser with a regular beat."

Little thanked the creature and left, to ponder the effect of the new facts on his plans. He returned almost at once, to ask another question:

"Does the garrison at the fort appear to expect the ship at any time before its actual arrival?"

"Not obviously, if at all," was the answer.

Little nodded, satisfied. He sought out the Dennis brothers. Leo was in their sleeping room, trying to manufacture a photometer from the lenses of a pair of dark goggles an atomic engineer had found in his pocket. The doctor located Arthur and brought him back to the room, and asked if either one knew anything about geletane.

"Not much," answered Leo. "I gathered that it was more than an ordinary anæsthetic when I heard you had lived through an exposure to space while under its influence."

"Right," nodded Little. "It produces, to put it crudely, suspended animation. It is absorbed apparently, on all the cell surfaces in the body, foreign bacteria included, and seals them from chemical influence. One would expect that to produce death, since the destruction of the gas film could not start the vital processes again; but the patient always revives. I could put my finger on ten different theses in the New York Medical Library, each suggesting a different mechanism and none completely satisfactory. The film, when it breaks, seems to do so everywhere at once, and there is an abnormal amount of carbon dioxide in the blood immediately thereafter; but the whole process is not thoroughly understood.

"It seems, however, that the cell walls themselves tend to cause the breakdown of the film; and if a person exposed to the gas is exercising violently, that action is increased to a point where he is *not affected at all.* If he holds his breath, and otherwise suspends body activity, it gets him almost instantly. The gas, as you can see, has an all-or-none nature. I wanted you to understand this, because it is possible we may have to use the gas in the near future. Think it over." The brothers kept their faces nearly expressionless, but it was perceptible that they thought the matter over with some pleasure. Arthur, slightly the more imaginative of the two, immediately assumed that the gassing was to take place when the communicator was finished, so that they would have a chance to use it.

With this pleasant prospect in mind, Arthur worked even longer that night. The converter was completed, and he began to construct a support for the tube and its connections before he was forced to sleep. Again, his work apparently went undetected by the ever-prowling guards. His hopes showed so clearly on his face the next morning that his brother kicked him firmly and ungently in the shins as a reminder of the unbelievable expression-comprehension of the pentapods.

He reported to Little that the device would probably be completed that night. The doctor nodded and said:

"Good work, Art. We probably had another week before the ship left, but this is better than I expected. As soon as Leo gets his photometer done and finds our distance from S Doradus, things should start to pop; and that should be fairly soon." In this statement Little was half right; things started happening quite soon, but they did not wait for the navigator's mate to complete his tasks.

The doctor found Leo seated on one of the steps which lined the outer wall. He was examining closely an object, consisting chiefly of several small fragments of darkened glass, which proved to be his photometer; and like his brother, he was obviously in good humor.

"All done, doc," he said on sighting Little. I can measure tonight—calibrate this thing on stars I can estimate, and then do the beacon. It's lucky I already know its absolute magnitude. What do you think are the chances of that gadget of Art's reaching a United receiver?"

Little smiled without speaking, and shrugged his shoulders. His opinion was that the question was unimportant, but it would not do to say so. He might be misunderstood. He fully believed that they would be caught the moment they attempted to start broadcasting. Without committing himself, he admonished Leo not to lose the photometer, and went in search of Magill.

To that officer he spoke earnestly for several minutes, making several requests which were granted only after persuasion. One of them had to do with the disposal of kitchen waste, and for once the doctor's interest was not in sanitation.

The rest of the day passed in as boring a fashion as had the two preceding.

Evening found the three conspirators in their room, planning the night's activities. Arthur, of course, would remain to "sleep." They found difficulty in deciding whether Little should remain with him, or accompany Leo on his astronomical expedition. If he went without an obvious purpose, the guards might wonder why he was the only curious sightseer and why Arthur didn't go, too; if he remained, they might wonder why he behaved differently from the previous

occasion, and investigate the sleepers. Even the insight Little had gained into their thought processes could throw no light on this question.

Finally, he accompanied Leo, carrying the latter's pencil and pad to provide himself with an excuse. As on the previous occasion, none of the guards followed them through the door. They took up their former station by the wall and seated themselves on the steps until S Doradus should rise. The moon was only a little past first quarter, and the beacon would not rise tonight until some two hours after the eclipse, so they had a wait of nearly four hours. They had chosen to come out early, to avoid falling asleep and missing their chance.

For the first time since their arrival on the planet, there were clouds in the sky. These provided matter for conversation and anxiety for nearly three hours as they completely covered the heavens on two occasions; but by the time the waning moon was sinking low in the east they had disappeared. The remaining time before observation could be started was passed in silence.

As the glow on the eastern horizon warned of the mighty star's advent, Leo went to work. Each of the fragments of glass he had obtained from the engineer's goggles was tested in turn, a star viewed through the darkened glass being compared with another seen directly. Little noted the results on the pad, though there was little need. The lenses had originally been very evenly darkened, and as nearly as Leo could estimate, a single thickness of the glass cut about three and five-tenths magnitudes from the brightness of an object.

When the beacon rose, his only task was to find the number of layers necessary to reduce its apparent brightness to that of a star lying in the range where his own judgment was good. The method obviously gave room for error, which increased with each additional thickness used, but it was better than guessing; and anyway, as Leo remarked, since S Doradus is an irregular variable, the best instruments in Civilization would still have left them with a probable error of over half a magnitude.

He measured and computed. "Art was almost right, at that," he remarked finally. " 'Near S Doradus' would almost be enough. I get an apparent magnitude of minus fourteen, which means a distance of just under one parsec." He took a fresh sheet of paper from the pad and wrote rapidly. "There," he said, handing it to Little, "is the complete specification of our position, to two decimal places—I can't guess closer. It also includes the type of this planet and sun in standard terms, and a rough idea of our latitude on the planet. If you broadcast that and anyone hears you, they'll find us."

"And he can go right ahead and broadcast it, as soon as the rubbernecks are out of the way," broke in a new voice. "The gadget's done. I haven't tested it, naturally, but it can't help working. Say the word, Doc."

Little shook his head. "Not tonight. We must arrange some way to keep the broadcast from being too obvious. Come on to bed and we'll talk as we go. It would be too bad to slip up now."

They arose and walked slowly toward the lighted doorway.

"It seems to me that we only need to gas the guards in the immediate neighborhood, and lock ourselves into the quarters with them outside. There are no outside catches on the main doors, and I could seal the elevator panel with the welder—I didn't use it for the broadcaster, and it should stand the overload long enough."

They passed into the corridor. "That might work," mused the doctor. "There is only the one elevator, and no other entrances to the roof, from below, anyway. But we'd want as many hours as we could get, and I should think they could burn out the elevator door in a few minutes."

They entered the room in which they slept. "That could be prevented by simply leaving that door open when the elevator was up and going into action at that time," contributed Leo as they pulled off their boots. "Then they couldn't get at either the elevator or its door."

"How about the other men?" asked Little. "It will be difficult to tell them all about the geletane, and how to avoid its effects. What will—"

"Stop worrying about it," interrupted Arthur. He had lain down with the pack for a pillow, moved it to a more comfortable spot, noticed the ease with which it moved and, with a horrible suspicion in his mind, looked into the kit box inside. "The communicator is gone."

Possibly the guards in the corridor and on the roof were laughing, if their unhuman cerebral processes had ever evolved an emotion akin to humor. Certainly, they were pleased with themselves.

"You loon," growled Leo. "Why did you

have to celebrate finishing the thing by tearing outside to tell us? It would have been simpler just to step outside our door and hand it to a guard."

The night had not passed too peacefully, in spite of Little's advice to save recriminations until morning. Relations between the twins were slightly strained. The sunlight coming through the window revealed only too clearly on Leo's face that expression of smug, "*I* wouldn't do such a thing" superiority that tends to drive repentant sinners to homicide.

"The meeting will please come to order," interrupted the doctor. "Leo, lay off Arthur. If it will make you any happier, Art, I'll tell you that if neither of you boys had spilled the beans in a day or two, I should have done so myself—carefully, of course. It was better for it to happen naturally. Now sit around, and wear a disgusted expression for the benefit of the guards if you like, and listen. This will take some time.

"In the first place, I suppose you've realized by now that we were captured simply for observation purposes; the pentapods hoped to learn about our weapons and science from our efforts to escape. They have, we must admit, been rather successful. Our activities have probably been evident to them from the first, but they waited until the communicator was completed before taking it, naturally. That habit of theirs struck me when the Vegans first described the way in which their plans were never interfered with until nearly mature.

"There was also the question of the surprising ease with which they were able to divine our feeling and intentions. It took me longer to discover the reason for that; but information supplied by the Vegans again provided the key.

"Their language is not verbal. None of us has yet heard them utter a vocal sound. We couldn't understand how they communicated, but to the Vegans it was so evident as to be unworthy of comment—their captor's language was of the same type as their own, visual rather than audible, a sign language in which the thousands of mobile spines with which their bodies are covered replaced the two antennae of a Vegan. It was so complex that the Vegans couldn't begin to learn it, but the method was obvious to them.

"That, to me, gave a nearly complete picture not only of their language, but of their thought; not only of the way they exchanged ideas, but of the very nature of those ideas.

"You have heard, no doubt, that thoughts may be considered as unuttered words. Of course, we do think in visual images, too, but *logical reasoning*, in human minds at least, takes the form of an unuttered conversation with oneself. Think through the proof of a theorem in grade-school geometry, if you don't believe it. With creatures like the Vegans, an analogous process takes place; they think in terms of the visible symbols of their language. The language, as you know, is slow—takes much longer to get ideas across. Also, it takes longer for a Vegan to comprehend something, though they certainly can't be called stupid.

"The same thing should happen, and does happen, with our captors. They think and talk immeasurably *faster* than we do; and their thoughts are not in arbitrary word or picture symbols, but in attitudes. Watching them, I have come to the conclusion that they don't have a language as we understand it at all; the motions and patterns of the spines, which convey thought from one to another, are as unconscious and natural as expressions on our faces. The difference being that their 'faces' cover most of their bodies, and have a far greater capacity for expression. The result is that they have as easy a time learning to interpret expressions and bodily attitudes of other creatures, as we would have learning a simple verbal tongue. What the psychologists call attitude —or expression, to us—is the key to their whole mental activity. Until we understood that, we had no chance of using their own methods to defeat them, or even of understanding the methods.

"When Albee and the others made that break, you noticed that the pentapods wasted no time in pursuing a man who was even slightly out of reach; they were able to reason with extreme rapidity even in a situation like that, and realized that they couldn't catch him. A man would have tried, at least.

"Like everything else, this high-speed communication has its disadvantages. These creatures could never have invented the telephone, any more than the Vegans did; and they'd have had the same difficulty with gadgets such as the telegraph. I don't know anything about their written language, but it must be ideographic and contain, unless I underestimate their capacity for bringing order out of chaos, a perfectly appalling number of symbols. Who would make up a dot-and-dash code for that? The Orientals of Earth had the same trouble. That would

interfere with the 'evolution' of communication devices.

"Their long-distance communication, therefore, must be purely visual transmission. We have seen the television screens in their office downstairs—ten feet square, enough to picture any of the creatures full length. I'm sure that they can't broadcast their vision for two reasons: the Vegans say the ship always returns unexpectedly, and preparations are never made a few hours in advance of its arrival—as they would be if they could broadcast news of their approach. Also, there is no sign anywhere on this building of a beam type second-order projector, or even the loop of a general field broadcaster such as Art was making. The images are transmitted by wire, and only inside this building. That was the reason, Art, that I insisted on your making a visual transmitter. They would have no desire to copy a telephone unit. They have it now; they'll have a full-size visual before that ship leaves; and their communications room is right below here, and should contain emergency accumulators in case the regular power goes.

"When the ship leaves, we wait a day. Then we collect the kitchen refuse, which Denham is accumulating, and pile it into the elevator to take outside—Leo, get that happy expression off your face—making the load big enough so that none of the guards can ride with us, though they don't usually these days anyway. Just before we go, the stove will break down, and Denham will come kicking about it. Arthur will go back, tinker with the stove, remove the geletane tank now clamped to it and replace it with another, and toss the 'used' tank in with the rest of the waste. The elevator will descend one floor, and we will emerge with the tank open. We will *run* toward the office, which is just down the hall, in order to avert the effects of the geletane by activity; we will hold handkerchiefs over our faces to let the guards know we have gas, and hold their breaths. Two of us will enter the communication office, while the third will remain outside to destroy the door control. He can spend the rest of his time welding the door shut, until that welder gives out.

"The guards and operators inside should be under the influence of the gas by then, and will be thrown out before the welding starts. The two of us who are inside will keep exercising until the ventilators clear the air in the room; then we can use the vision transmitter to our heart's content, until the starfish can bring up heavy tools and burn through the door. There are a dozen United bases within five hundred parsecs, even I know; and five minutes should be ample to contract one of them and give our situation.

"Art, did you really think I hoped to get anywhere with that pint-sized thing you built? The pentapods have us here so that we can build equipment for them; I decided that turn about was fair play. I only hope those infernally quick minds of theirs don't grasp the fact that two can play at one game. In case they should, I think we had better start working with Magill on whatever plan he has evolved; that will keep us occupied, reduce the chance of our betraying our secret, and may prove a valuable second string to the bow if our plan falls through. Let's have breakfast."

Little had spoken lightly of "working in" with Magill on whatever plan of escape that worthy might have evolved; at breakfast he discovered that no less than four lines of attack were being developed simultaneously. The quartermaster was hoping that one of them would go undiscovered long enough to reach a climax. He had not divided the men into separate groups for each job; the idea was to confuse the guards by having everybody work on all the plans at once. Confusion had certainly resulted, though none of the pentapods showed the symptoms. Little, first making sure that his own private plan would not be affected by any of the others, plunged joyfully into the conflicting tasks of (1) finding and using one or more of the aircraft which Magill was positive were stored beneath the roof; (2) getting an armed party of human beings into the interstellar flier of the pentapods; (3) carrying out the original Vegan plan of flooding the building with ultraviolet light without at the same time forcing out the men; and (4) locating an arsenal of the pentapods and simply clearing a section of the building by brute force. Magill intended to use whichever of these plans first attained practicability.

Four days were spent in this fashion. Work at least prevented them from being as boring as the preceding three, though little or no progress was made. On the morning of the fifth day, however, just after the morning meal, an event occurred which opened a fifth line of procedure, and almost caused Magill to abandon the others.

One of the men had gone out onto the roof; and the others were attracted by his

cry. Little, following the others to the edge of the roof, looked over; and was rewarded with a clear view of nothing at all. The line of pentapods which had been loading supplies into the vast cruiser was not to be seen, and the vessel's ports were closed. The men watched silently and expectantly, reasonably sure of what was to happen.

Perhaps ten minutes passed without a word being spoken; then, without sound or ceremony, the tremendous cylinder of metal drifted lightly upward. The men followed it for a short distance with their eyes; they might have watched longer, if their attention had not been distracted by an object revealed by the cruiser's departure.

Just beyond the depression in the soil left by the great ship there appeared a second, much smaller, silvery metal torpedo; and a howl of surprise burst from almost every human throat on the rooftop. It was the *Gomeisa,* her ports open, apparently unharmed, and—apparently deserted.

For several seconds after that involuntary expression of astonishment there was dead silence; then Magill spoke.

"This puts a new light on the situation. Don't do anything rash until we decide just how this affects our position; our plans will certainly need modification. I'll be in the market for ideas all morning; we'll have a general discussion meeting after dinner." He turned away from the edge and walked back toward the doorway.

Denham had long since been coached in his part; he played it without a hitch. The load of refuse and the tank of geletane were tossed into the elevator; the three men followed. No guards entered; since the departur of their ship they had concentrated on guarding the lower doors rather than preventing the prisoners from wandering about the fort. Little slid the door of the cage closed and touched the button next to the top, and Arthur took the welder from his pocket.

Slow as it was, the car took but a few seconds to reach the next level. It stopped; Little looked at his companions and slid open the door, at the same instant opening the valve of his gas tank. The three dashed into the corridor and toward the office, handkerchiefs pressed over their mouths and noses.

Two pentapods stood at the open door of the communication room. They swept instantly toward the approaching men, but must have conversed with others inside the room even in that time, for three more emerged after them.

Fast as the men were running, the gas diffused ahead of them; and the rearmost guards, who were moving more slowly than the others were, paradoxically, the first to go down under the invisible attack. The others heard them fall, deduced the cause, presumably held their breath—and dropped as though shot. The men hurtled into the room, Little still leading, and found it empty. Evidently the communication officers had joined the guards and, confident of their ability to overcome three human beings, had not even sounded an alarm.

Leo Dennis leaped toward a mass of equipment that was all too plainly of recent installation; Little reversed his motion, snatched the welder from Arthur's hand, and darted back through the door.

"I'll look after this end," he said, "and saturate the air in the corridor while I'm at it. I'm more used to gas and can probably avoid its effects longer than you, Art." He slid the metal portal shut with a clang, tossed the still-open gas cylinder across the hall, and set to work with the welder. He jumped up and down, kicking, dancing, and waving his free arm as he worked; but the hand holding the torch remained steady.

Reluctantly, the metal of door and frame fused and flowed under the heat. The tiny lever that had actuated the opening mechanism dripped away. Slowly a glowing line of red marked the edge of the door and extended around it, a line that did not cease its slow growth as a dozen guards raced around a corner and collapsed as one the moment they paused to take in the situation. One, at least, must have been far enough behind to signal to others; seconds later, another group, clad in transparent, baggy air suits, sped into sight. At almost the same instant the little torch expired.

Little straightened, dropping the instrument, and saw the approaching guards. He turned to run toward the elevator, and saw another group rapidly approaching from that direction. Knowing the futility of the attempt, he tried to dodge past them; one swerved, reached, and an instant later he was pinned motionless as he had been once before in the first break for freedom. But he was still in the region of geletane-impregnated air.

Dr, Little opened his eyes with that peculiar feeling of having done the same thing before. This time memory returned

almost instantly; he struggled to his feet, helped by the men clustered around him. He was on the roof of the fort where a stiff breeze had cleared the last of the gas from his lungs and cell walls. No guards were in evidence.

"How did it go?" he asked, seeing the grinning features of the Dennis brothers beside him. "Did you get through?"

"We did. It took them nearly an hour to get heavy tools and cut in—after all, we had control of their local 'telephone' central. They must have called their own ship back at once; it came in ten minutes ago, and they're rushing stuff aboard. I think they're going to abandon this place before help arrives for us. The Ardomese I talked to promised a squadron in fifteen hours.

"I wish that starfish ship had been farther away—we might have been able to take some prisoners of our own. But I'm afraid they'll have time to clear out."

"You're not annoyed, are you?" asked Little. "After all, they didn't hurt you fellows when they found you in the communication room. I think they're rather good sports, myself. After all, they've been risking all along the chance that we might do just what we did; they haven't hurt anyone; and the *Gomeisa* is not seriously damaged.

"Nevertheless, they committed an act of war against the Union," cut in Magill, "and they have stolen a lot of valuable information. The *Gomeisa* carried stuff that could make them dangerous enemies."

"They have had plenty of time to duplicate that armament, and unquestionably have done so," returned Little, "but they seem to have no intention of staying and using it on your ships. I think their curiosity was purely academic; perhaps this was all a game to them. In any case, I can't make myself feel anger toward them. I'm curious, myself, and personally I rather like the creatures. You can make yourself do the same, Keys; the whole thing is only a question of attitude." The doctor traded knowing winks with the Dennis brothers.

IN TIMES TO COME

LEADING off our next issue is A. E. van Vogt's "The Storm." In "Concealment," present in this issue, the concept of weather in space is introduced—but in the lead story next month the idea is more fully developed. Since space—particularly interstellar space—is a hard vacuum, more thoroughly evacuated than any vacuum tube man's made to date—it might seem impossible that weather could exist there, or that storms could be present. But van Vogt's idea seems so completely sound that the unimaginably vast, æon-long storms he describes must exist—must be a very real and important hazard to a highly developed interstellar civilization. Any physicist can tell you that a bit of lead can drop between the poles of a powerful magnet almost unimpeded—but that a high-velocity lead bullet passing between those same magnet poles may explode into vapor! That has a bearing on van Vogt's "Storm."

There's another item, brought to my mind by the idea behind "Concealment" in this issue—the idea of concealment in the sheer number of stars. The thing that came to my mind has nothing to do with science-fiction—it's the purest fact. If you live in, or close to, a large city, on an average summer night you can see the whole heavens sprinkled with numberless stars of all magnitudes, the moment you step out of your lighted house. When you've been in the starlight a few minutes your eyes become more sensitive, but when you first step out, you can probably see—oh, two thousand stars at the most. Probably near fifteen hundred.

The point of this bit of astronomical observation? Well, those infinitely remote stars, shining down in utter silence, are so remote that the nearest of them, exploding into a supernova, wouldn't affect you at all. But suppose you were a Nazi antiaircraft gunner somewhere in the Ruhr, looking up into a sky containing very nearly fifteen hundred bombers, with six thousand huge motors beating their mighty drums against the sky, bearing four to six million pounds of death to explode about you—

Next time you glance up at the stars, think of them for a moment as the navigation lights of a fleet of bombers—a fleet, quite literally, numberless as the stars!

THE EDITOR.

ROBINC

By H. H. HOLMES

Politics and robots are, alike, very curious things. But they're alike in another way—if you look at things straight, and don't throw out answers even if they do seem more than a little screwy, you can use them effectively—

YOU'D think maybe it meant clear sailing after we'd got the Council's O.K. You'd maybe suppose that'd mean the end of our troubles and the end of android robots for the world.

That's what Dugg Quinby thought, anyway. But Quinby may have had a miraculous gift of looking straight at problems and at things and at robots and getting the right answer; but he was always too hopeful about looking straight at people. Because, like I kept saying to him, people aren't straight, not even to themselves. And our future prospects weren't anywhere near as good as he thought.

That's what the Head of the Council was stressing when we saw him that morning just after the Council had passed the bill. His black face was sober—no trace of that flashing white grin that was so familiar on telecasts. "I've put your bill through, boys," he was saying. "God knows I'm grateful —the whole empire should be grateful to you for helping me put over the renewal of those Martian mining concessions, and the usuform barkeep you made me is my greatest treasure; but I can't help you any more. You're on your own now."

That didn't bother Quinby. He said, "The rest ought to be easy. Once people understand what usuform robots can do for them—"

"I'm afraid, Mr. Quinby, it's you who don't quite understand. Your friend here doubtless does; he has a more realistic slant on things. But you—I wouldn't say you idealize people, but you flatter them. You expect them to see things as clearly as you do. I'm afraid they usually don't."

"But surely when you explained to the Council the advantages of usuforms—"

"Do you think the Council passed the bill only because they saw those advantages? They passed it because I backed it, and because the renewal of the Martian concessions have for the moment put me in a powerful position. Oh, I know, we're supposed to have advanced immeasurably beyond the political corruption of the earlier states; but let progress be what it may, from the cave man on up to the illimitable future, there are three things that people always have made and always will make: love, and music, and politics. And if there's any difference between me and an old-time political leader, it's simply that I'm trying to put my political skill at the service of mankind."

I wasn't listening too carefully to all this. The service of mankind wasn't exactly a hobby of mine. Quinby and the Head were all out for usuforms because they were a service to man and the Empire of Earth; I was in it because it looked like a good thing. Of course you can't be around such a mixture of a saint, a genius, and a moron as Quinby without catching a little of it; but I tried to keep my mind fixed clear on what was in it for me.

And that was plenty. For the last couple of centuries our civilization had been based on robots—android robots. Quinby's usuform robots—Q.U.R.—robots shaped not as mechanical men, but as independently thinking machines formed directly from their intended function—threatened the whole robot set-up. They were the biggest thing since Zwergenhaus invented the mechanical brain, and I was in on the ground floor.

With the basement shaking under me.

It was an android guard that interrupted the conference here. We hadn't really got

started on usuform manufacture yet, and anyway, Quinby was inclined to think that androids might be retained in some places for guards and personal attendants. He said, "Mr. Grew says that you will see him."

The Head frowned. "Robinc has always thought it owned the Empire. Now Mr. Grew thinks he owns me. Well, show him in." As the guard left, he added to us. "This Grew-Quinby meeting has to take place some time, I'd rather like to see it."

The president-owner of Robinc—Robots Incorporated, but nobody ever said it in full—was a quiet old man with silvery hair and a gentle sad smile. It seemed even sadder than usual today. He greeted the Head and then spoke my name with a sort of tender reproach that near hurt me.

"You," he said. "The best trouble-shooter that Robinc ever had, and now I find you in the enemy's camp."

But I knew his technique, and I was armed against being touched by it. "*In* the enemy's camp?" I said. "I *am* the enemy. And it's because I was your best trouble-shooter that I learned the real trouble with Robinc's androids: They don't work, and the only solution is to supersede them."

"Supersede is a kind word," he said wistfully. "But the unkind act is destruction. Murder. Murder of Robinc itself, draining the lifeblood of our Empire."

The Head intervened. "Not draining, Mr. Grew, but transfusing. The blood stream, to carry on your own metaphor, is tainted; we want fresh blood, and Mr. Quinby provides it."

"I am not helpless, you know," the old man murmured gently.

"I'm afraid possibly you are, sir, and for the first time in your life. But you know the situation: In the past few months there has been an epidemic of robot breakdowns. Parts unnecessary and unused, but installed because of our absurd insistence on an android shape, have atrophied. Sometimes even the brain has been affected; my own confidential cryptanalyst went totally mad. Quinby's usuforms forestall any such problem."

"The people will not accept them. They are conditioned to androids."

"They must accept them. You know, better than most, the problems of supply that the Empire faces. The conservation of mineral resources is one of our essential aims. And usuforms will need variously from seventy to only thirty percent of the metal that goes into your androids. This is no mere matter of business rivalry; it is conflict between the old that depletes the Empire and the new that strengthens it."

"And the old must be cast aside and rejected?"

"You," I began, "have, of course, always shown such tender mercy to your business compet—" but Quinby broke in on me.

"I realize, Mr. Grew, that this isn't fair to you. But there are much more important matters than you involved."

"Thank you." The gentle old voice was frigid.

"But I wouldn't feel right if you were simply, as you put it, cast aside and rejected. If you'll come to see us and talk things over, I'm pretty sure we can—"

"Sir!" Sanford Grew rose to his full short height. "I do not ask favors from puppies. I have only one request." He turned to the Head. "The repeal of this ridiculous bill depriving Robinc of its agelong monopoly which has ensured the safety of the Empire."

"I'm sorry, Mr. Grew. That is impossible."

The hair was still silvery and the smile was still sad and gentle. But the words he addressed to us were, "Then you understand that this is war?"

Then he left. I didn't feel too comfortable. Saving the Empire is all very well. Being a big shot in a great new enterprise is swell. But a war with something the size of Robinc is not what the doctor usually orders.

"The poor man," said Quinby.

The Head flashed an echo of the famous grin. "No wonder he's upset. It's not only the threatened loss of power, I heard that yesterday his android cook broke down completely. And you know how devoted he is to unconcentrated food."

"Quinby brightened. "Then perhaps we—"

The Head laughed. "Your only hope is that a return to a concentrated diet will poison him. You've no chance of winning over Sanford Grew alive."

We went from there to the Sunspot. "It's funny," Quinby used to say. "I don't much like to drink, but a bar's always good for heavy thinking." And who was I to argue?

Guzub, that greatest of bartenders, spotted us as we came in and had one milk and one straight whiskey poured by the time we reached our usual back table. He served them to us himself, with a happy flourish of his tentacles.

"What are you so beamish about?" I asked gruffly.

Guzub shut his middle eye in the Martian expression of happiness. "Begauze you boys are going to 'ave a gread zugzezz with your uxuvorm robods and you invended them righd 'ere in the Zunzbod." He produced another tentacle holding a slug of straight vuzd and downed it. "Good lugg!"

I glowered after him. "We need luck. With Grew as our sworn enemy, we're on the—"

Quinby had paper spread out before him. He looked up now, took a sip of milk, and said, "Do you cook?"

"Not much. Concentrates do me most of the time."

"I can sympathize with Grew. I like old-fashioned food myself and I'm fairly good at cooking it. I just thought you might have some ideas."

"For what?"

"Why, a usuform cook, of course. Grew's android cook broke down. We'll present him with a usuform, and that will convert him, too—"

"Convert hell!" I snorted. "Nothing can convert that sweetly smiling old— But maybe you have got something there; get at a man through his hobby— Could work."

"Now usually," Quinby went on, "androids break down because they don't use all their man-shaped body. But an android cook would go nuts because man's body isn't enough. I've cooked; I know. So we'll give the usuform more. For instance, give him Martoid tentacles instead of arms. Maybe instead of legs give him an automatic sliding height adjustment to avoid all the bending and stooping, with a roller base for quick movement. And make the tentacles functionally specialized."

I didn't quite get that last, and I said so.

"Half your time in cooking is wasted reaching around for what you need next. We can build in a lot of that stuff. For instance, one tentacle can be a registering thermometer. Tapering to a fine point—stick it in a roast and— One can end in a broad spoon for stirring—heat-resistant, of course. One might terminate in a sort of hand, of which each of the digits was a different-sized measuring spoon. And best of all—why the nuisance of bringing food to the mouth to taste? Install taste-buds in the end of one tentacle."

I nodded. Quinby's pencil was covering the paper with tentative hookups. Suddenly he paused. "I'll bet I know why android cooks were never too successful. Nobody ever included the Verhaeren factor in their brains."

The Verhaeren factor, if you've studied this stuff at all, is what makes robots capable of independent creative action. For instance it's used in the robots that turn out popular fiction—in very small proportion, of course.

"Yes, that's the trouble. They never realized that a cook is an artist as well as a servant. Well, we'll give him in his brain what he needs for creation, and in his body the tools he needs to carry it out. And when Mr. Grew has had his first meal from a usuform cook—"

It was an idea, I admitted, that might have worked on anybody but Sanford Grew—get at a man and convert him through what's dearest to his heart. But I'd worked for Grew. I knew him. And I knew that no hobby, not even his passion for unconcentrated food, could be stronger than his pride in his power as president of Robinc.

So while Quinby worked on his usuform cook and our foreman Mike Warren got our dowser ready for the first big demonstration, I went ahead with the anti-Robinc campaign.

"We've got four striking points," I explained to Quinby. "Android robots atrophy or go nuts; usuforms are safe. Android robots are almost as limited as man in what they can do without tools and accessories; usuforms can be constructed to do anything. Android robots are expensive because you've got to buy an all-purpose one that can do more than you need; usuforms save money because they're specialized. Android robots use up mineral resources; usuforms save them."

"The last reason is the important one," Quinby said.

I smiled to myself. Sure it was, but can you sell the people on anything as abstract as conservation? Hell no. Tell 'em they'll save credits, tell 'em they'll get better service, and you've got 'em signed up already. But tell 'em they're saving their grandchildren from a serious shortage and they'll laugh in your face.

So as usual, I left Quinby to ideas and followed my own judgment on people, and by the time he'd sent the cook to Grew I had all lined up the campaign that could blast Grew and Robinc out of the Empire. The three biggest telecommentators were all sold on usuforms. A major solly producer

was set to do a documentary on them. Orders were piling up about twice as fast as Mike Warren could see his way clear to turning them out.

So then came the day of the big test.

We'd wanted to start out with something big and new that no android could possibly compete with, and we'd had the luck to run onto Mike's brother-in-law, who'd induced in robot brains the perception of that *n*th sense that used to enable dowsers to find water. Our usuform dowser was God's gift to explorers and fresh exciting copy. So the Head had arranged a big demonstration on a specially prepared field, with grandstands and fireworks and two bands—one human, one android—and all the trimmings.

We sat in our box, Mike and Quinby and I. Mike had a shakerful of Three Planet cocktails mixed by our usuform barkeep; they aren't so good when they stand, but they were still powerful enough to keep him going. I was trying to get along on sheer will power, but little streams of sweat were running down my back and my nails were carving designs in my palms.

Quinby didn't seem bothered. He kept watching the android band and making notes. "You see," he explained, "it's idiotic waste to train a robot to play an instrument, when you could make an instrument that *was* a robot. Your real robot band would be usuforms, and wouldn't be anything but a flock of instruments that could play themselves. You could even work out new instruments, with range and versatility and flexibility beyond the capacity of human or android fingers and lungs. You could—"

"Oh, oh," I said. There was Sanford Grew entering our box.

The smile was still gentle and sad, but it had a kind of warmth about it that puzzled me. I'd never seen that on Grew's face before. He advanced to Quinby and held out his hand. "Sir," he said, "I have just dined."

Quinby rose eagerly, his blond head towering above the little old executive. "You mean my usuform—"

"Your usuform, sir, is indubitably the greatest cook since the Golden Age before the devilish introduction of concentrates. Do you mind if I share your box for this great exhibition?"

Quinby beamed and introduced him to Mike. Grew shook hands warmly with our foreman, then turned to me and spoke even my name with friendly pleasure. Before anybody could say any more, before I could even wipe the numb dazzle off my face, the Head's voice began to come over the speaker.

His words were few—just a succinct promise of the wonders of usuforms and their importance to our civilization—and by the time he'd finished the dowser was in place on the field.

To everybody watching but us, there was never anything that looked less like a robot. There wasn't a trace of an android trait to it. It looked like nothing but a heavy duralite box mounted on caterpillar treads.

But it was a robot by legal definition. It had a Zwergenhaus brain and was capable of independent action under human commands or direction. That box housed the brain, with its *n*th-sensory perception, and eyes and ears, and the spike-laying apparatus. For when the dowser's perception of water reached a certain level of intensity, it layed a metal spike into the ground. An exploring party could send it out on its own to survey the territory, then follow its tracks at lesisure and dig where the spikes were.

After the Head's speech there was silence. Then Quinby leaned over to the mike in our box and said "Go find water."

The dowser began to move over the field. Only the Head himself knew where water had been cached at various levels and in various quantities. The dowser raced along for a bit, apparently finding nothing. Then it began to hesitate and veer. Once it paused for noticeable seconds. Even Quinby looked tense. I heard sharp breaths from Sanford Grew, and Mike almost drained his shaker.

Then the dowser moved on. There was water, but not enough to bother drilling for. It zoomed about a little more, then stopped suddenly and definitely. It had found a real treasure trove.

I knew its mechanism. In my mind I could see the Zwergenhaus brain registering and communicating its needs to the metal muscles of the sphincter mechanism that would lay the spike. The dowser sat there apparently motionless, but when you knew it you had the impression of a hen straining to lay.

Then came the explosion. When my eyes could see again through the settling fragments, there was nothing in the field but a huge crater.

It was Quinby, of course, who saw right off what had happened. "Somebody," my

numb ears barely heard him say, "substituted for the spike an explosive shell with a contact-fuse tip."

Sanford Grew nodded. "Plausible, young man. Plausible. But I rather think that the general impression will be simply that usuforms don't work." He withdrew, smiling gently.

I held Mike back by pouring the rest of the shaker down his throat. Mayhem wouldn't help us any.

"So you converted him?" I said harshly to Quinby. "Brother, the next thing you'd better construct is a good guaranteed working usuform converter."

The next week was the low point in the history of Q.U.R. I know now, when Quinby's usuforms are what makes the world tick, it's hard to imagine Q.U.R. ever hitting a low point. But one reason I'm telling this is to make you realize that no big thing is easy, and that a lot of big things depend for their success on some very little thing, like that chance remark of mine I just quoted.

Not that any of us guessed then how important that remark was. We had other things to worry about. The fiasco of that demonstration had just about cooked our goose. Sure, we explained it must've been sabotage, and the Head backed us up; but the wiseacres shook their heads and muttered "Not bad for an alibi, *but—*"

Two or three telecommentators who had been backing us switched over to Grew. The solly producer abandoned his plans for a documentary. I don't know if this was honest conviction or the power of Robinc; it hit us the same either way. People were scared of usuforms now; they might go *boom!* And the biggest and smartest publicity and advertising campaign of the past century was fizzling out *fft* before our helpless eyes.

It was the invaluable Guzub who gave us our first upward push. We were drinking at the Sunspot when he said, "Ah, boys— Zo things are going wrong with you, bud you zdill gome 'ere. No madder wad abbens, beoble zdill wand three things: eading and dringing and—"

Quinby looked up with the sharp pleasure of a new idea. "There's nothing we can do with the third," he said. "But eating and drinking— Guzub, you want to see usuforms go over, don't you?"

"And remember," I added practically, "you've got a royalty interest in our robot barkeep."

Guzub rolled all his eyes up once and down once—the Martian trick of nodding assent.

"All right," said Quinby. "Practically all bartenders are Martians, the tentacles are so useful professionally. Lots of them must be good friends of yours?"

"Lodz," Guzub agreed.

"Then listen—"

That was how we launched the really appealing campaign. Words? Sure, people have read and heard millions upon billions of words, and one set of them is a lot like another. But when you get down to Guzub's three essentials—

Within a fortnight there was one of our usuform barkeeps in one bar out of five in the influential metropolitan districts. Guzub's friends took orders for drinks, gave them to the usuforms, served the drinks, and then explained to the satisfied customers how they'd been made—pointing out besides that there had *not* been an explosion. The customers would get curious. They'd order more to watch the usuform work. (It had Martoid tentacles and its own body was its shaker.) The set-up was wonderful for business—and for us.

That got at the men. Meanwhile we had usuform cooks touring the residential districts and offering to prepare old-fashioned meals free. There wasn't a housewife whose husband didn't say regularly once a week, "Why can't we have more old-fashioned food instead of all these concentrates? Why, my mother used to—"

Few of the women knew the art. Those of them who could afford android cooks hadn't found them too satisfactory. And husbands kept muttering about mother. The chance of a happy home was worth the risk of these dreadful dangerous new things. So our usuform cooks did their stuff and husbands were rapturously pleased and everything began to look swell. (We remembered to check up on a few statistics three quarters of an hour later—it seemed we had in a way included Guzub's third appeal after all.)

So things were coming on sweetly until one day at the Sunspot I looked up to see we had a visitor. "I heard that I might find you here." Sanford Grew smiled. He beckoned to Guzub and said "Your oldest brandy."

Guzub knew him by sight. I saw one tentacle flicker hesitantly toward a bottle of mikiphin, that humorously named but none

the less effective knockout liquor. I shook my head, and Guzub shrugged resignedly.

"Well?" Quinby asked directly.

"Gentlemen," said Sanford Grew, "I have come here to make a last appeal to you."

"You can take your appeal," I said, "and—"

Quinby shushed me. "Yes, sir?"

"This is not a business appeal, young men. This is an appeal to your consciences, to your duty as citizens of the Empire of Earth."

I saw Quinby looking a little bothered. The smiling old boy was shrewd; he knew that the conscience was where to aim a blow at Quinby. "Our consciences are clear—I think and trust."

"Are they? This law that you finagled through the Council, that destroyed what you call my monopoly—it did more than that. That 'monopoly' rested on our control of the factors which make robots safe and prevent them from ever harming living beings. You have removed that control."

Quinby laughed with relief. "Is that all? I knew you'd been using that line in publicity but I didn't think you expected us to believe it. There are other safety factors beside yours. We're using them, and the law still insists on the use of some, though not necessarily Robinc's. I'm afraid my conscience is untouched."

"I do not know," said Sanford Grew, "whether I am flattering or insulting you when I say I know that it is no use trying to buy you out at any price. You are immune to reason—"

"Because it's on our side," said Quinby quietly.

"I am left with only one recourse." He rose and smiled a gentle farewell. "Good day, gentlemen."

He'd left the brandy untouched. I finished it, and was glad I'd vetoed Guzub's miki.

"One recourse—" Quinby mused. "That must mean—"

I nodded.

But it started quicker than we'd expected. It started, in fact, as soon as we left the Sunspot. Duralite arms went around my body and a duralite knee dug into the small of my back.

The first time I ever met Dugg Quinby was in a truly major and wondrous street brawl, where the boy was a whirlwind. Quinby was mostly the quiet kind, but when something touched him off—and injustice was the spark that usually did it—he could fight like fourteen Martian mountaineers defending their idols.

But who can fight duralite? Me, I have some sense; I didn't even try. Quinby's temper blinded his clear vision for a moment. The only result was a broken knuckle and some loss of blood and skin.

The next thing was duralite fingers probing for the proper spots at the back of my head. Then a sudden deft pressure, and blackness.

We were in a workshop of some sort. My first guess was one of the secret workshops that honeycomb the Robinc plant, where nobody but Grew's most handpicked men ever penetrate. We were cuffed to the wall. They'd left only one of the androids to guard us.

It was Quinby who spoke to him, and straight to the point. "What happens to us?"

"When I get my next orders," the android said in his completely emotionless voice, "I kill you."

I tried to hold up my morale by looking as indifferent as he did. I didn't make it.

"The last recourse—" Quinby said.

I nodded. Then, "But look!" I burst out. "This can't be what it looks like. He can't be a Robinc android because he's going," I gulped a fractional gulp, "to kill us. Robinc's products have the safety factor that prevents them from harming a living being, even on another being's orders."

"No," said Quinby slowly. "Remember that Robinc manufactures androids for the Empire's army? Obviously those can't have the safety factor. And Mr. Grew has apparently held out a few for his own bootleg banditti."

I groaned. "Trust you," I said. "We're chained up with a murderous android, and trust you to stand there calmly and look at things straight. Well, are you going to see straight enough to get us out of this?"

"Of course," he said simply. "We can't let Grew destroy the future of usuforms."

There was at least one other future that worried me more, but I knew there was no use bringing up anything so personal. I just stood there and watched Quinby thinking—what time I wasn't watching the android's hand hovering around his holster and wondering when he'd get his next orders.

And while I was waiting and watching, half scared sweatless, half trusting blindly in Quinby, half wondering impersonally what

death was like—yes, I know that makes three halves of me, but I was in no state for accurate counting—while I waited, I began to realize something very odd.

It wasn't me I was most worried about. It was Dugg Quinby. Me going all unselfish on me! Ever since Quinby had first seen the nonsense in androids—no, back of that, ever since that first magnifiscrumptious street brawl, I'd begun to love that boy like a son—which'd have made me pretty precocious.

There was something about him—that damned mixture of almost stupid innocence, combined with the ability to solve any problem by his—not ingenuity, precisely, just his inborn capacity for looking at things straight.

Here I was feeling selfless. And here he was coming forth with the first at all tricky or indirect thing I'd ever known him to pull. Maybe it was like marriage—the way two people sort of grow together and average up.

Anyway, he said to the android now, "I bet you military robots are pretty good marksmen, aren't you?"

"I'm the best Robinc ever turned out," the android said.

I worked for Robinc; I knew that each of them was conditioned with the belief that he was the unique best. It gave them confidence.

Quinby reached out his unfettered hand and picked a plastic disk off the worktable. "While you're waiting for orders, why don't you show us some marksmanship? It'll pass the time."

The robot nodded, and Quinby tossed the disk in the air. The android grabbed at its holster. And the gun stuck.

The metal of the holster had got dented in the struggle of kidnaping us. Quinby must have noticed that; his whole plan developed from that little point.

The robot made comments on the holster; military androids had a soldier's vocabulary built in, so we'll skip that.

Quinby said, "That's too bad. My friend here's a Robinc repair man, or used to be. If you let him loose, he could fix that."

The robot frowned. He wanted the repair, but he was no dope. Finally he settled on chaining my foot before releasing my hand, and keeping his own digits constantly on my wrist so he could clamp down if I got any funny notions about snatching the gun and using it. I began to think Quinby's plan was fizzling, but I went ahead and had the holster repaired in no time with the tools on the worktable.

"Does that happen often?" Quinby asked.

"A little too often." There was a roughness to the android's tones. I recognized what I'd run onto so often in trouble-shooting; an android's resentment of the fact that he didn't work perfectly.

"I see," Quinby went on, as casually as though we were here on social terms. "Of course the trouble is that you have to use a gun."

"I'm a soldier. Of course I have to use one."

"You don't understand. I mean the trouble is that you have to *use* one. Now, if you could *be* a gun—"

It took some explaining. But when the android understood what it could mean to be a usuform, to have an arm that didn't need to snatch at a holster because it was itself a firing weapon, his eye cells began to take on a new bright glow.

"You could do that to me?" he demanded of me.

"Sure," I said. "You give me your gun and I'll—"

He drew back mistrustfully. Then he looked around the room, found another gun, unloaded it, and handed it to me. "Go ahead," he said.

It was a lousy job. I was in a state and in a hurry and the sweat running down my forehead and dripping off my eyebrows didn't help any. The workshop wasn't too well equipped, either, and I hate working from my head. I like a nice diagram to look at.

But I made it somehow, very crudely, replacing one hand by the chamber and barrel and attaching the trigger so that it would be worked by the same nerve currents as actuated the finger movements to fire a separate gun.

The android loaded himself awkwardly. I stood aside, and Quinby tossed up the disk. You never saw a prettier piece of instantaneous trap-shooting. The android stretched his face into that very rare thing, a robot grin, and expressed himself in pungently jubilant military language.

"You like it?" Quinby asked.

All that I can quote of the robot's reply is "Yes," but he made it plenty emphatic.

"Then—"

But I stepped in. "Just a minute. I've got an idea to improve it." Quinby was probably trusting to our guard's gratitude; I wanted

a surer hold on him. "Let me take this off just a second—" I removed the chamber and barrel; I still had his hand. "Now," I said, "we want out."

He brought up the gun in his other hand, but I said, "Ah, ah! Naughty!" You aren't supposed to kill us till you get orders, and if you do they'll find you here with one hand. Fine state for a soldier. You can't repair yourself; you need two hands for it. But if we get out, you can come with us and be made over as much as you want into the finest efficient happy usuform soldier."

It took a little argument, but with the memory of that one perfect shot in his mind it didn't take much. As Quinby said afterward, "Robinc built pride into its robots to give them self-confidence. But that pride also gave them vanity and dissatisfaction with anything less than perfection. That's what we could use. It was all perfectly simple—"

"—when you looked at it straight," I chorused with him.

"And besides," he said, "now we know how to lick Robinc forever."

That was some comfort, I suppose, though he wouldn't say another word to explain it. And I needed comfort, because just then things took a nasty turn again. We stuck close to our factory and didn't dare go out. We were taking no chances on more kidnapings before Quinby finished his new inspiration.

Quinby worked on that alone, secret even from us. I figured out some extra touches of perfection on the usuform soldier, who was now our bodyguard—Grew would never dare complain of the theft because he'd had no legal right to possess such an android, anyway. Mike and his assistants both living and usuform, turned out barkeeps and dowsers and cooks—our three most successful usuform designs so far.

We didn't go out, but we heard enough. It was the newest and nastiest step in Grew's campaign. He had men following up our cooks and bartenders and managing to slip concentrated does of ptomaine alkaloids into their products. No serious poisoning, you understand; just an abnormally high proportion of people taken sick after taking usuform-prepared food or drink. And a rumor going around that the usuforms secreted a poisonous fluid, which was objective nonsense, but enough to scare a lot of people.

"It's no use," Mike said to me one day. "We're licked. Two new orders in a week. We're done for. No use keeping up production."

"The hell we're licked," I said.

"If you want to encourage me, you'd ought to sound like you believed it yourself. No, we're sunk. While *he* sits in there and—I'm going down to the Sunspot and drink Three Planets till this one spins. And if Grew wants to kidnap me, he's welcome to me."

It was just then the message came from the Head. I read it, and knew how the camel feels about that last straw. It said:

I can't resist popular pressure forever. I know and you know what Grew is up to; but the public is demanding re-enactment of the law giving Robinc exclusive rights. Unless Quinby can see straight through the hat to the rabbit, that re-enactment is going to pass.

"We'll see what he has to say to this," I said to Mike. I started for the door, and even as I did so Quinby came out."

"I've got it!" he said. "It's done." He read the Head's message with one glance, and it didn't bother him. He grabbed me by the shoulders and beamed. I've never heard my name spoken so warmly. "Mike, too. Come on in and see the greatest usuform we've hit on yet. Our troubles are over."

We went in. We looked. And we gawked. For Quinby's greatest usuform, so far as our eyes could tell, was just another android robot.

Mike went resolutely off to the Sunspot to carry out his threat of making this planet spin. I began to think myself that the tension had affected Quinby's clear-seeing mind. I didn't listen especially when he told me I'd given him the idea myself. I watched the usuform-android go off on his mysterious mission and I even let him take my soldier along. And I didn't care. We were done for now, if even Dugg Quinby was slipping.

But I didn't have time to do much worrying that morning. I was kept too busy with androids that came in wanting repairs. Very thoroughgoing repairs, too, that turned them, like my soldier, practically into usuforms. We always had a few such requests—I think I mentioned how they all want to be perfect—but this began to develop into a cloudburst. I stopped the factory lines and put every man and robot on repair.

Along about mid-afternoon I began to feel puzzled. It took me a little while to get it, and then it hit me. The last three that I'd repaired had been brand-new. Fresh from

the Robinc factory, and rushing over here to be remade into . . . into usuforms!

As soon as I finished adjusting drill arms on the robot miner, I hurried over to where Quinby was installing an infra-red color sense on a soldier intended for camouflage-spotting. He looked up and smiled when he saw me. "You get it now?"

"I get what's happening. But how . . . who—"

"I just followed your advice. Didn't you say what we needed was a guaranteed working usuform converter?"

"I don't need to explain, do I? It's simple enough once you look at it straight."

We were sitting in the Sunspot. Guzub was very happy; it was the first time the Head had ever honored his establishment.

"You'd better," I said, "remember I'm a crooked-reviewing dope."

"But it's all from things you've said. You're always saying I'm good at things and robots, but lousy at people because people don't see or act straight. Well, we were stymied with people. They couldn't see the real importance of usuforms through all the smoke screens that Grew threw up. But you admit yourself that robots see straight, so I went direct to them. And you said we needed a usuform converter, so I made one."

The Head smiled. "And what is the utile form of a converter?"

"He had to look like an android, because otherwise they wouldn't accept him. But he was the sturdiest, strongest android ever made, with several ingenious, new muscles. If it came to fighting, he was sure to make converts that way. And besides, he had something that's never been put in a robot brain before—the ability to argue and convince. With that, he had the usuform soldier as a combination bodyguard and example. So he went out among the androids, even to the guards at Robinc and from then on inside; and since he was a usuform converter, well—he converted."

The Head let the famous grin play across his black face. "Fine work, Quinby. And if Grew hadn't had the sense to see at last that he was licked, you could have gone on with your usuform converters until there wasn't an android left on Earth. Robinc would have toppled like a wooden building with termites."

"And Grew?" I asked. "What's become of him?"

"I think, in a way, he's resigned to his loss. He told me that since his greatest passion was gone, he was going to make the most of his second greatest. He's gone off to his place in the mountains with that usuform cook you gave him, and he swears he's going to eat himself to death."

"Me," said Mike, with appropriate business, "I'd like a damper death."

"And from now on, my statisticians assure me, we're in no danger of ever using up our metal stockpile. The savings on usuforms will save us. Do you realize, Quinby, that you're just about the most important man in the Empire today?"

That was when I first heard the band approaching. It got louder while Quinby got red and gulped. It was going good when he finally said, "You know, if I'd ever thought of that, I . . . I don't think I could have done it."

He meant it to. You've never seen an unhappier face than his when the crowd burst into the Sunspot yelling "Quinby!" and "Q.U.R.!"

But you've never seen a prouder face than mine as I saw it then in the bar mirror. Proud of myself, sure, but only because it was me that discovered Dugg Quinby.

DOODAD

By RAY BRADBURY

Did Man attain supremacy by specializing? No! Man is supreme because he can do everything instead of something. Then why should a machine be made the unsuccessful way? Why shouldn't it, like Man, do everything—

THERE was a crowd pressed together in front of the shop.

Crowell light-footed it into that crowd, his face long and sad. He cast a glance back over one lean shoulder, muttered to himself, and widened a lane through the people, quick.

A hundred yards back of him a low shining black beetle car hummed to the curb. A door clicked open, and the fat man with the gray-white face climbed heavily out, his expression one of silent, dead-pan hatred. Two bodyguards sat in the front seat.

Gyp Crowell wondered why he bothered running away. He was tired. Tired of trying to tell news over the audio every night and waking up every morning with gangsters at his heels just because he had mentioned the fact that "a certain fat man has been doing some dishonest finagling of Plastics, Inc."

Now, here was the fat man himself. That black beetle car had trailed Crowell from Pasadena all the way here.

Crowell lost himself in the crowd. He wondered vaguely why this crowd should be so curious about the shop. Certainly it was unusual, but so is everything else in southern California. He broke through the inner circle, looked up at the large scarlet lettering over the blue glass windows, stared at it without a flicker of expression on his lean, perpetually sad face:

The sign on the shop said:

THINGUMABOBS DOODADS
WATCHAMACALLITS HINKIES
FORMODALDAFRAYS
HOOTINANNIES GADGETS
DOOHINGIES

Crowell took it in a dead calm. So this was the assignment his audio editor had given him to cover? Small-time screwpot stuff. Should be handled by a cub reporter. Nuts.

Then he thought about Steve Bishop, the fat man with the guns and the bodyguards. Any old port in a storm.

Crowell drew out a small transpara pad, scribbed down a few of those names—doohingies, hinkies—realizing that Bishop couldn't shoot him in this mob. Sure, maybe he had a right to shoot, after that threatened exposé and the blackmail Gyp was using against Bishop: the three-dimensioned color images—

Crowell eased over to the translucent door of the shop, pushed it, and followed it in. He'd be safe in here, and doing his routine news assignment, too.

Brilliant light flushed the interior of the shop; pouring over a cold blue-and-white color scheme. Crowell felt chilly. Counting seventeen display cases, he investigated their contents at random, dead-gray eyes flicking passionlessly.

A very tiny man popped out from behind a blue glass case. He was so tiny and bald that Crowell had to repress a desire to pat him upon the head in fatherly fashion. That bald head was made for patting.

The tiny man's face was quite square and a peculiar yellowed tint, as if it had been aged much in the same manner as an old newspaper. "Yes?" he said.

Crowell said "Hello" quietly, taking his time. Now that he was in here he had to say something. So he said, "I want to buy a . . . a doohingey." His voice struck the same tiredly grieved note his face expressed.

"Fine, fine," said the tiny man. He dry-washed his hands. "I don't know why, but you're the first customer. The other people just stand out there and laugh at my shop.

Now—what year doohingey will you have? And what model?"

Crowell didn't know. He knew only surprise, but his face didn't show it. He'd begun his inquiry as if he knew all about it. Now was no time to confess ignorance. He pretended to muse over the problem and finally said, "I guess a 1973 model would do. Nothing too modern."

The tiny proprietor blinked. "Ah. Ah, I see you are a man of precise decision and choice. Step right this way." And he scuttled down an aisle, to pause before a large case in which reclined a—something.

It may have been a crankshaft, and yet it resembled a kitchen shelf with several earrings dangling along a metal edge which supported three horn-shaped attachments and six mechanisms Crowell couldn't recognize, and a thatch of tentacles resembling shoelaces poured out of the top.

Crowell made a throat noise, as if strangling on a button. Then he looked again. He decided that the tiny man was an utter idiot; but he kept this decision sealed in his gaunt brain.

As for the little proprietor, he was standing in a perfect ecstasy of happiness, eyes shining, lips parted in a warm smile, hands clasped over his chest, bending forward expectantly.

"Do you like it?" he asked.

Crowell nodded gravely. "Ye-ess. Ye-ess, I guess it's all right. I've seen better models, though."

"Better!" the little man exclaimed. He drew himself up. "Where?" he demanded. "Where!"

Crowell could have gotten flustered. He didn't. He simply took out his note pad, scribbled in it, kept his eyes on it and said cryptically. *You* know where—" hoping this would satisfy the man.

It did.

"Oh!" gibbered the proprietor. "Then *you* know, too. How fine to deal with a connoisseur. How fine."

Crowell flicked a glance out the window, past the chuckling crowd. The fat man and his bodyguards and the black beetle car were gone. They had given up the chase for a while.

Crowell whipped his pad into his pocket, put his hand on the case with the doohingey in it. "I'm in a great hurry. Could I take it with me? I haven't money, but I'll make a down payment in trade. All right?"

"Perfectly all right."

"O.K." Crowell, with some misgiving, reached into his loose-fitting gray blouse and drew forth a metal apparatus, an old pipe cleaner that had seen better days. It was broken and bent into a weird shape. "Here you are. A hinkie. A 1944 model hinkie."

"Oh." The little man exhaled dismay. He stared with horror at Crowell. "Why, that's not a hinkie!"

"Uh . . . isn't it?"

"No, of course not."

"Of course not," repeated Crowell carefully.

"It's a whatchamacallit," said the little man, blinking. "And not a whole one, either; just part of one. You like your little joke, don't you, Mr—"

"Crowell. Yeah. My little joke. Yeah. If you don't mind. Trade? I'm in a great hurry."

"Yes, yes. I'll load it on a skate platform so we can roll it out to your car. One moment."

The tiny man moved swiftly, procuring a small wheeled truck, onto which he transferred the doohingey. He helped Crowell roll it to the door. Crowell stopped him at the door. "Just a moment." He looked out. The black beetle car was nowhere in sight. Good. "O.K."

The little man's voice was soft with caution. "Just remember, Mr. Crowell—please don't go around killing people with this doohingey. Be . . . be selective. Yes, that's it, be selective and discerning. Remember, Mr. Crowell?"

Crowell swallowed a number-ten-size lump in his throat.

"I'll remember," he said, and hurriedly finished the deal.

He took the low-level avenue tube out of the Wilshire district heading for his home in Brentwood. Nobody trailed him. He was sure of that. He didn't know what Bishop's plans for the next few hours might be. He didn't know. He didn't care. He was in the middle of another pall of melancholy. It was a lousy, screwball world, in which everybody had to be dishonest to get along. That fat slug of a Bishop, he—

The contraption on the seat beside him drew his attention. He looked at it with a little shaking dry laugh coming out of his mouth.

"So you're a doohingey?" he said. "Huh. Everybody to their own special racket. Bishop and his plastics, me and my black-

mail, and that little dope with the doodads and hingdooies. At that, I think the little guy is the smartest."

He turned his white beetle car off the subbranch tube and went down a side tunnel that came up under his block. Garaging his car and scanning the surrounding park carefully, he lugged the doohingey upstairs, opened the dial door, went in, closed the door, and set the doohingey on the table. He poured himself a few fingers of brandy.

A moment later someone rapped softly, quietly and very slowly on the door. No use putting it off. Crowell answered and opened it.

"Hello, Crowell."

The fat man at the door had a face like cooked pork, cold and flabby. His eyelids drooped over red-veined, green-irised eyes. He had a cigar in his mouth that moved with his words.

"Glad you're home, Crowell. Been waiting to see you."

Crowell backed up and the fat man came in. That fat man sat down, put his hands over his round belly and said, "Well?"

Crowell swallowed. "I haven't got the images here, Bishop."

The fat man didn't say anything. He unlocked his two hands slowly, reached into his pocket as if to get a handkerchief and brought out a small paralysis gun instead. Cold blue steel.

"Change your mind, Crowell?"

Crowell's sad white face looked all sadder with cold sweat on it. His throat mucles lengthened. He tried to get his brain working, but it was locked in cement, hard and hot and furiously, suddenly afraid. It didn't show through to the outside. He saw Bishop, the gun, the room joggling up and down in his vision.

And then he saw the . . . the doohingey.

Bishop shifted the safety stud on the gun. "Where'll you have it? Head or chest. They say you die quicker if they paralyze your brain first. I prefer touching the heart with it, myself. Well?"

"Wait a moment," said Crowell carelessly. He made himself draw back a slow pace. He sat down, all the while realizing that Bishop's finger was quavering on a hair trigger. "You're not going to kill me; you're going to thank me for letting you in on the greatest invention of our time."

Bishop's huge face didn't change a line or muscle. His cigar waggled. "Snap it, Crowell. I haven't time for greasing the tongue."

"Plenty of time," said Crowell, calmly. "I've got a perfect murder weapon for you. Believe it or not, I have. Take a look at that machine sitting on the table."

The gun remained firm, blue steel. Bishop's eyes slide to one side of his face, jerked back. "So what?" he said.

"So if you listen to me you can be the biggest plastics boss to ever hit the Pacific coast. You want that, don't you?"

Bishop's eyes widened a microscopic trifle, narrowed. "Are you stalling me for time?"

"Look, Bishop, I know when I'm cooked. That's why I'm cutting you in on . . . on that damned doohingey of mine."

"On that *what!*"

"I just call it a doohingey. Haven't got a name for it yet." Crowell's brain was rotating, throwing ideas off one after another with the heated centrifuge of desperation. One idea stuck: *Keep Bishop stalled until you have a chance to get his gun. Bluff him. Bluff him like hell. Now—*

Crowell cleared his throat. "It . . . it's a radio killer," he lied. "All I have to do is give it directions and it'll kill anyone. No mess. No nothing. No clues. Perfect crime, Bishop. Interested?"

Bishop shook his head. "You been drinking. It's getting late—"

"Hold on," said Crowell, suddenly tensing forward, his gray eyes bright. "Don't move, Bishop. I've got you covered. That machine is trained on you. Before you came in I set it to a certain frequency. One squeak out of you and it'll nail you!"

Bishop's cigar fell to the floor. The gun hand wavered.

Crowell saw his chance. His lean muscles bunched into one tight, compact coil. His mouth opened, words darted out. "Watch it, Bishop! All right, machine, do your stuff! Kill Bishop!"

And with that, Crowell catapulted himself. He felt himself leave the chair, saw the startled look on Bishop's face. The misdirection had worked. The gun went off. The silver beam sizzled past Crowell's ear and splashed on the wall. Crowell snatched with both hands to clutch Bishop, get the gun.

But Crowell never got to Bishop.

Bishop was dead.

The doohingey got there first.

Crowell had a drink. Then he had another. His stomach was floating in the stuff. But he still couldn't forget how Bishop looked—dead.

Bishop had died—how? He had been sort of stabbed, shot, strangled, electrocuted—he'd been . . . uh . . . you know what I mean? He was sort of—dead. Yeah, that's it. Dead.

Crowell had another drink just on account of that. He looked at the bedroom wall and decided that sometime in the next minutes those bodyguards would be busting in up here, looking for their boss. But Crowell couldn't stand the thought of going in the living room to see where Bishop lay on the floor next to the—doohingey. He shivered.

After two more drinks that didn't even touch his mind, he got around to packing some of his clothes. He didn't know where he was going, but he was going. He was about to leave the house when the audio made a gonging noise.

"Yes?"

"Mr. Crowell?"

"Talking."

"This is the little man at the Doodads Shop."

"Oh, yeah. Hello."

"Would you mind dropping by the shop again? And please bring the doohingey with you, yes? I fear that I've short-changed you on that model. I have another one here that is much better."

Crowell's voice got caught in his throat. "This one seems to be working fine."

He cut the contact and held onto his brains with both hands so they couldn't slide down into his shoes. He hadn't planned on killing anybody. He didn't like the idea. And that put him on the spot even more than before. Those gunmen bodyguards wouldn't stop now until—

His jaw stiffened. Let them come after him. He wasn't running away this time. He was staying in town, doing his news work as if nothing had happened. He was tired of the whole business. He didn't care if he got shot now or not. He'd even laugh with joy when they were shooting.

No use making unnecessary trouble, though. He'd carry the fat man's—body—down to the garage, put it in the back seat of the white beetle, and drive past some lonely spot, bury it, and hold the bodyguards off by telling them he had kidnaped Bishop. Yeah, that was a good idea. Clever man this Crowell.

"All right—" He tried to lift Bishop's tremendous body. He couldn't. He finally got the body downstairs to the beetle, though—the doohingey did it.

Crowell stayed upstairs until the job was done. He didn't like to watch the doohingey at work with a dead body.

"Ah, Mr. Crowell." The little proprietor opened the gleaming glass door. There was still a small crowd outside. "I see you brought the doohingey. Good."

Crowell set the contraption on the counter, thinking quickly to himself. Well. Now maybe explanations would be made. He'd have to be subtle; no blunt questions. He'd—

"Look, Mr. Whosis, I didn't tell you, but I'm an audio reporter. I'd like to broadcast a story about you and your shop for the Audio-News. But I'd like it in your own words."

"You know as much about the thingumabobs as I do," replied the little man.

"Do I?"

"That's the impression you gave me—"

"Oh, sure. Sure I do. But it's always better when we quote somebody. See?"

"Your logic is nebulous, but I shall cooperate. Your listeners will probably want to know all about my Doodad Shop, eh? Well, it took thousands of years of traveling to make it grow."

"Miles," corrected Crowell.

"Years," stated the little man.

"Naturally," said Crowell.

"You might call my shop the energy result of misconstrued improper semanics. These instruments might well be labeled 'Inventions That Do Everything Instead Of Something.'"

"Oh, of course," said Crowell, blankly.

"Now, when a man shows another man a particular part of a beetle car's automotive controls and he can't recall the proper label for that part, what does he do?"

Crowell saw the light. "He calls it a doodad or a hingey or a whatchamacallit. Right?"

"Correct. And if a woman, talking to another woman about her washing machine or egg beater or knitting or crochetting and *she* had a psychological blocking, forgets the proper semantic label, what does *she* say?"

"She says 'Take this hungamabob and trinket and turndel with it. You grasp the dipsy and throw it over the flimsy,'" said Crowell, like a school kid suddenly understanding mathematics.

"Correct!" cried the little man. "All right, then. Therefore we have the birth of incor-

rect semantic labels that can be used to describe anything from a hen's nest to a motor-beetle crankcase. A doohingey can be the name of a scrub mop or a toupee. It's a term used freely by everybody in a certain culture. A doohingey isn't just one thing. It's a thousand things.

"Well, now, what I have done is form into energy the combined total of all things a doohingey has ever referred to. I have entered the minds of innumerable civilized humans, extracted their opinion of what *they* call a doohingey, what *they* call a thingum, and created from raw atomic energy a physical contraption of those mentally incorrect labelings. In other words, my inventions are three-dimensional representations of a semantic idea. Since the minds of people make a doohingey anything from a carpet sweeper to a number-nine-size nut-and-bolt, *my* inventions follow the same pattern. The doohingey you carried home today could do almost anything you would want it to do. Many of the inventions have robotlike functions, due to the fact that the abilities of movement, thought and mechanical versatility were included in them."

"They can do everything?"

"Well, not everything. Most of the inventions have about sixty different processes, all alien, all mixed, all shapes, sizes, molded into them. Each one of my creations has a different set of services. Some are big. Some small. Some of the big ones have many, many services. The small ones have only one or two simple functions. Not two are alike. Think of the space and time and money you save by buying a doohingey!"

"Yeah," said Crowell. He thought about Bishop's body. "Your doohingey is certainly versatile, all right."

"That reminds me," said the little man. "About that 1944 model hinkie you sold me in trade. Where did you get it?"

"Get it? You mean that pipe cle— I mean, the hinkie? I— Oh, well, I—"

"You don't have to be secretive. We share trade secrets, you know. Did you make it yourself?"

"I . . . I bought it and worked on it. The . . . the power of thought, you know."

"Then you *know* the secret? How astonishing! I thought I was the only one who knew about the transmission of thought into energy forms. Brilliant man. Did you study in Rruhre"

"No. I was always sorry I never got there. Never had the opportunity. I had to struggle along alone. Look, I'd like to turn this doohingey in for another apparatus. I don't like it."

"You don't like it? Why not?"

"Oh, I just don't. Too cumbersome. Give me something simple every time."

Yeah, simple, he thought, something you can see how it works.

"What kind of machine do you want this time, Mr. Crowell?"

"Give me a . . . gadget."

"What year gadget?"

"Does that make a great deal of difference, what year?"

"Oh, you're joking again, aren't you?"

Crowell swallowed. "I'm joking."

"You know, of course, that in each year for thousands of years that the type of gadget and the name for a gadget would be different. A thingooey of the year 1965 would be an oddsblodkins in 1492. Or a ettubrutus in the days of Caesar."

"Are *you* joking?" asked Crowell. "No. Never mind. Give me my gadget and I'll go home."

That word "home" startled Crowell. It wouldn't be wise to go there just yet. Hide out for a while until he could send a message to the bodyguard saying that he was holding Bishop a prisoner. Yes. That was it. That was safest.

In the meantime he was curious about this shop, but not curious enough to have horrible contraptions like that doohingey near him. The little man was talking:

"I've a whole case full of thingumabobs from all historical periods I'll give you," he was saying. "I'm so overstocked with stuff, and nobody but you takes me seriously so far. I haven't made one sale today. It's quite saddening."

Crowell felt sorry for the man, but— "Tell you what. I've got an empty storage room in my house. Send the stuff around in a few days and I'll look it over and take what I like."

"Can't you take some of it with you now?" pleaded the little man.

"I don't think I can—"

"Oh, it's small. Very small stuff. Really. Here, I'll show you. A few little boxes of trinkets and knicknacks. Here. Here they are." He bent behind a counter, brought out six boxes, enough to load Crowell's arms up to the chin.

Crowell opened one box. "Sure. I'll take these. Nothing but soup strainers, paring knives, lemon juicers, doorknobs and old meerschaum pipes from Holland. Sure, I'll

take *these.*" They looked safe. They were small, simple. Nothing wrong with them.

"Oh, thank you. Thank you. Put these in the back of your beetle, gratis. I'm glad to clean them out of the store. I've done so much energy creating in the last few years or so I'll be relieved to get rid of them. Sick and tired of looking at them. There you go."

Crowell, his arms full, staggered out to his white beetle and tossed the stuff in the back seat. He waved to the little man, said he'd see him again in a few days, and drove off.

The hour spent in the shop, the gibbering joy of the little man, the bright lights, had made him forget, for the time, about Bishop's godyguards and Bishop himself.

The beetle car hummed under him. He headed downtown toward the Audio studios, trying to decide what was wisest to do. He reached back, curiously, and pulled out one of the little gadgets. It was nothing more nor less than a pipe. Seeing it, made him hungry for a smoke, so he took the pipe, filled it with markings from his blouse pouch, and lit it, experimentally, carefully. He puffed smoke. Fine. A good pipe.

He was busy enjoying the pipe when he noticed something in the rear-view mirror. He was being followed by two black beetle cars. Not mistaking those low ebony high-powered crawlers.

He cursed silently and put on speed. The beetles were catching up with him, gaining speed every instant. There were two thugs in one of them, and two in the other.

"I'll stop and tell them that I'm holding their boss as hostage," said Crowell to himself.

There were guns gleaming in the hands of the thugs in the black cars.

Crowell realized that they would shoot first and talk later. He hadn't planned that. He had planned on hiding away and calling them and giving them his ultimatum. But—*this!* They were coming after him. He wouldn't have a chance to explain before they'd shoot him down.

He increased the speed with his foot. Sweat came out to play on his forehead. What a mess. He was beginning to wish he hadn't returned the doohingey to the shop. He could use it now, just as he had inadvertently used it on Bishop.

Doohingey! Gadgets!

Crowell cried out in relief. Maybe—

He reached into the back seat and scrabbled wildly among the litter of gadgets. None of them looked like they could do anything, but he'd try, anyhow.

"O.K., you thingums, do your stuff! Protect me, damn you!"

There was a rattling crisp noise and something metallic thumped past Crowell's ears, winged outside on transparent glass wings back in the direction of the pursuing enemy car and hit it head on.

There was an explosion of green fire and gray smoke.

The fraltamoret had done its work. It was a combination of a little boy's automatic airplane and an explosive projectile.

Crowell pressed the floor plate and shot his beetle ahead again. The second car was still pursuing. They wouldn't give up.

"Get them!" cried Crowell. "Get them, too! Get them any way you can!" He dumped two boxes of trinkets out the window. Several of them took flight. The others bounced harmlessly on the cement.

Two missiles glittered in the air. They looked like old-fashioned pinking shears, sharp and bright, and an antigravity main-mechanistic drive attached. They sang along the boulevard until they got to the remaining black beetle car.

They went in through the open windows, gleaming.

The black beetle car lost its control and went off the avenue, turning over and over, smashing, and bursting into a sudden savage fire.

Crowell slumped in his seat. He let the beetle slow down and pull around a corner and over to the curb, stopping. He was breathing fast. His heart crashed.

He could go home now, if he wanted to. There would be no one else waiting for him at home, waiting to ambush him, stop him, question him, threaten him.

He could go home now. Funny, but he didn't feel relieved or happy. He just felt dark, unhappy, ill at ease. The world was a lousy place to live in. He had a bitter taste in his mouth.

He drove home. Well, maybe things would be better. Maybe.

He took the remaining boxes of trinkets and got out of the beetle and took the vac-elevator upstairs. He opened the door and laid the boxes down and sorted through them.

He still had that pipe in his mouth, after all the excitement. He had picked it up automatically and put it back in his mouth. He

was nervous. Needed another smoke now to quiet his mind.

He put fresh tobacco in his new pipe and puffed it into life. That little man was a screw for giving him all this stuff. Dangerous to have this sort of knowledge lying around in the world. All kinds of wrong people might get hold of it, use it.

He laughed, and puffed at his pipe.

From now on, he'd play big shot. With the help of the little man and the shop, he'd make those big Plastics officials jump, pay him money, obey his every thought. Damn them.

It sounded like a lot of trouble, though. He sat down and scowled and brooded about it and his thoughts got dark, like they had been for so many years. Pessimistic.

What was the use of trying to do anything in this world? Why did he bother to go on living? He got so tired.

Sometimes, like tonight and so many nights in the long years, he felt that it might be a good idea if those gunmen caught up with him and filled him full of paralysis. Sometimes, if he had a gun in his own fingers, *he'd blast his brains out.*

There was a sharp explosion. Crowell stood up suddenly. He stiffened and fell down on his knees.

He'd forgotten about the pipe in his mouth—forgotten it was a thingumabob gadget.

It took an unpleasantly fatal way of reminding him.

CONCEALMENT

By A. E. van VOGT

He was willing to blow himself and his strange weather station—that watched the movement of millenium-long storms of inter-stellar space—to atoms to conceal the secret of his people. They were safe, concealed in the haystack of a hundred trillion stars—unless he gave a clue!

THE Earth ship came so swiftly around the planetless Gisser sun that the alarm system in the meteorite weather station had no time to react. The great machine was already visible when Watcher grew aware of it.

Alarms must have blared in the ship, too, for it slowed noticeably and, still braking, disappeared. Now it was coming back, creeping along, obviously trying to locate the small object that had affected its energy screens.

It loomed vast in the glare of the distant yellow-white sun, bigger even at this distance than anything ever seen by the Fifty Suns, a very hell ship out of remote space, a monster from a semi-mythical world, instantly recognizable from the descriptions in the history books as a battleship of Imperial Earth. Dire had been the warnings in the histories of what would happen someday—and here it was.

He knew his duty. There was a warning, the age-long dreaded warning, to send to the Fifty Suns by the non-directional subspace radio; and he had to make sure nothing telltale remained of the station.

There was no fire. As the overloaded atomic engines dissolved, the massive building that had been a weather substation simply fell into its component elements.

Watcher made no attempt to escape. His brain, with its knowledge, must not be tapped. He felt a brief, blinding spasm of pain as the energy tore him to atoms.

She didn't bother to accompany the expedition that landed on the meteorite. But she watched with intent eyes through the astroplate.

From the very first moment that the spy rays had shown a human figure in a weather

station—a weather station *out here*—she had known the surpassing importance of the discovery. Her mind leaped instantly to the several possibilities.

Weather stations meant interstellar travel. Human beings meant Earth origin. She visualized how it could have happened; an expedition long ago; it must have been long ago because now they had interstellar travel, and that meant large populations on many planets.

His majesty, she thought, would be pleased.

So was she. In a burst of generosity, she called the energy room.

"Your prompt action, Captain Glone," she said warmly, "in inclosing the entire meteorite in a sphere of protective energy is commendable, and will be rewarded."

The man whose image showed on the astroplate, bowed. "Thank you, noble lady." He added: "I think we saved the electronic and atomic components of the entire station. Unfortunately, because of the interference of the atomic energy of the station itself. I understand the photographic department was not so successful in obtaining clear prints."

The woman smiled grimly, said: "The *man* will be sufficient, and that is a matrix for which we need no prints."

She broke the connection, still smiling, and returned her gaze to the scene on the meteorite. As she watched the energy and matter absorbers in their glowing gluttony, she thought:

There had been several storms on the map in that weather station. She'd seen them in the spy ray; and one of the storms had been very large. Her great ship couldn't dare to go fast while the location of that storm was in doubt.

Rather a handsome young man he had seemed in the flashing glimpse she had had in the spy ray, strong-willed, brave. Should be interesting in an uncivilized sort of fashion.

First, of course, he'd have to be conditioned, drained of relevant information. Even now a mistake might make it necessary to begin a long, laborious search. Centuries could be wasted on these short distances of a few light years, where a ship couldn't get up speed, and where it dared not maintain velocity, once atttained, without exact weather information.

She saw that the men were leaving the meteorite. Decisively, she clicked off the intership communicator, made an adjustment and stepped through a transmitter into the receiving room half a mile distant.

The officer in charge came over and saluted. He was frowning:

"I have just received the prints from the photographic department. The blur of energy haze over the map is particularly distressing. I would say that we should first attempt to reconstitute the building and its contents, leaving the man to the last."

He seemed to sense her disapproval, went on quickly:

"After all, he comes under the common human matrix. His reconstruction, while basically somewhat more difficult, falls into the same category as your stepping through the transmitter in the main bridge and coming to this room. In both cases there is dissolution of elements—which must be brought back into the original solution."

The woman said: "But why leave him to the last?"

"There are technical reasons having to do with the greater complexity of inanimate objects. Organized matter, as you know, is little more than a hydro-carbon compound, easily conjured."

"Very well." She wasn't as sure as he that a man and his brain, with the knowledge that had made the map, was less important than the map itself. But if both could be had— She nodded with decision. "Proceed."

She watched the building take shape inside the large receiver. It slid out finally on wings of antigravity, and was deposited in the center of the enormous metal floor.

The technician came down from his control chamber shaking his head. He led her and the half dozen others who had arrived, through the rebuilt weather station, pointing out the defects.

"Only twenty-seven sun points showing on the map," he said. "That is ridiculously low, even assuming that these people are organized for only a small area of space. And, besides, notice how *many* storms are shown, some considerably beyond the area of the reconstituted suns and—"

He stopped, his gaze fixed on the shadowy floor behind a machine twenty feet away.

The woman's eyes followed his. A man lay there, his body twisting.

"I thought," she said frowning, "the man was to be left to the last."

The scientist was apologetic: "My assistant must have misunderstood. They—"

The woman cut him off: "Never mind. Have him sent at once to Psychology House, and tell Lieutenant Neslor I shall be there shortly."

"At once, noble lady."

"Wait! Give my compliments to the senior meteorologist and ask him to come down here, examine this map, and advise me of his findings."

She whirled on the group around her, laughing through her even, white teeth. "By space, here's action at last after ten dull years of surveying. We'll rout out these hide-and-go-seekers in short order."

Excitement blazed inside her like a living force.

The strange thing to Watcher was that he knew before he wakened why he was still alive. Not very long before.

He *felt* the approach of consciousness. Instinctively, he began his normal Delian preawakening muscle, nerve and mind exercises. In the middle of the curious rhythmic system, his brain paused in a dreadful surmise.

Returning to consciousness? *He!*

It was at that point, as his brain threatened to burst from his head with shock, that the knowledge came of how it had been done.

He grew quiet, thoughtful. He stared at the young woman who reclined on a chaise longue near his bed. She had a fine, oval face and a distinguished appearance for so young a person. She was studying him from sparkling gray eyes. Under that steady gaze, his mind grew very still.

He thought finally: "I've been conditioned to an easy awakening. What else did they do—find out?

The thought grew until it seemed to swell his brainpan:

WHAT ELSE?

He saw that the woman was smiling at him, a faint, amused smile. It was like a tonic. He grew even calmer as the woman said in a silvery voice:

"Do not be alarmed. That is, not too alarmed. What is your name?"

Watcher parted his lips, then closed them again, and shook his head grimly. He had the impulse to explain then that even answering one question would break the thrall of Dellian mental intertia and result in the revolution of valuable information.

But the explanation would have constituted a different kind of defeat. He suppressed it, and once more shook his head.

The young woman, he saw, was frowning. She said: "You won't answer a simple question like that? Surely, your name can do no harm."

His name, Watcher thought, then what planet he was from, where the planet was in relation to the Gisser sun, what about intervening storms. And so on down the line. There wasn't any end.

Every day that he could hold these people away from the information they craved would give the Fifty Suns so much more time to organize against the greatest machine that had ever flown into this part of space.

His thought trailed. The woman was sitting up, gazing at him with eyes that had gone steely. Her voice held a metallic resonance as she said:

"Know this, whoever you are, that you are aboard the Imperial Battleship *Star Cluster*, Grand Captain Laurr at your service. Know, too, that it is our unalterable will that you shall prepare for us an orbit that will take our ship safely to your chief planet."

She went on vibrantly: "It is my solemn belief you already know that Earth recognizes no separate governments. Space is indivisible. The universe shall not be an area of countless sovereign peoples squabbling and quarreling for power.

"That is the law. Those who set themselves against it are outlaws, subject to any punishment which may be decided upon in their special case.

"Take warning."

Without waiting for an answer, she turned her head. "Lieutenant Neslor," she said at the wall facing Watcher, "have you made any progress?"

A woman's voice answered: "Yes, noble lady. I have set up an integer based on the Muir-Grayson studies of colonial peoples who have been isolated from the main stream of galactic life. There is no historical precedent for such a long isolation as seems to have obtained here, so I have decided to assume that they have passed the static period, and have made some progress of their own.

"I think we should begin very simply, however. A few forced answers will open his brain to further pressures; and we can draw valuable conclusions meanwhile from the speed with which he adjusts his resistance to the brain machine. Shall I proceed?"

The woman on the chaise longue nodded. There was a flash of light from the wall facing Watcher. He tried to dodge, and dis-

covered for the first time that *something* held him in the bed, not rope, or chain, nothing visible. But something as palpable as rubbery steel.

Before he could think further, the light was in his eyes, in his mind, a dazzling fury. Voices seemed to push through it, voices that danced and sang, and spoke into his brain, voices that said:

"A simple question like that—of course I'll answer . . . of course, of course, of course— My name is Gisser Watcher. I was born on the planet Kaider III, of Dellian parents. There are seventy inhabited planets, fifty suns, thirty billion people, four hundred important storms, the biggest at Latitude 473. The Central Government is on the glorious planet, Cassidor VII—"

With a blank horror of what he was doing, Watcher caught his roaring mind into a Dellian knot, and stopped that devastating burst of revelation. He knew he would never be caught like that again but—too late, he thought, too late by far.

The woman wasn't quite so certain. She went out of the bedroom, and came presently to where the middle-aged Lieutenant Neslor was classifying her findings on receptor spools.

The psychologist glanced up from her work, said in an amazed voice: "Noble lady, his resistance during the stoppage moment registered an equivalent of I. Q. 800. Now, that's utterly impossible, particularly because he started talking at a pressure point equivalent to I. Q. 167, which matches with his general appearance, and which you know is average.

"There must be a system of mind training behind his resistance. And I think I found the clue in his reference to his Dellian ancestry. His graph squared in intensity when he used the word.

"This is very serious, and may cause great delay—unless we are prepared to break his mind."

The grand captain shook her head, said only: "Report further developments to me."

On the way to the transmitter, she paused to check the battleship's position. A bleak smile touched her lips, as she saw on the reflector the shadow of a ship circling the brighter shadow of a sun.

Marking time, she thought, and felt a chill of premonition. Was it possible that one man was going to hold up a ship strong enough to conquer an entire galaxy?

The senior ship meteorologist, Lieutenant Cannons, stood up from a chair as she came toward him across the vast floor of the transmission receiving room, where the Fifty Suns weather station still stood. He had graying hair, and he was very old, she remembered, very old. Walking toward him, she thought:

There was a slow pulse of life in these men who watched the great storms of space. There must be to them a sense of futility about it all, a timelessness. Storms that took a century or more to attain their full roaring maturity, such storms and the men who catalogued them must acquire a sort of affinity of spirit.

The slow stateliness was in his voice, too, as he bowed with a measure of grace, and said:

"Grand Captain, the Right Honorable Gloria Cecily, the Lady Laurr of Noble Laurr, I am honored by your personal presense."

She acknowledged the greeting, and then unwound the spool for him. He listened, frowning, said finally:

"The latitude he gave for the storm is a meaningless quantity. These incredible people have built up a sun relation system in the Lesser Magellanic Cloud, in which the center is an arbitrary one having no recognizable connection with the magnetic center of the whole Cloud. Probably, they've picked some sun, called it center, and built their whole spatial geography around it."

The old man whirled abruptly away from her, and led the way into the weather station, to the edge of the pit above which poised the reconstructed weather map.

"The map is utterly worthless to us," he said succinctly.

"What?"

She saw that he was staring at her, his china-blue eyes thoughtful.

"Tell me, what is your idea of this map?"

The woman was silent, unwilling to commit herself in the face of so much definiteness. Then she frowned, and said:

"My impression is much as you described. They've got a system of their own here, and all we've got to do is find the key."

She finished more confidently: "Our main problems, it seems to me, would be to determine which direction we should go in the immediate vicinity of this meteorite weather station we've found. If we chose the wrong direction, there would be vexatious delay, and, throughout, our chief obstacle would

be that we dare not go fast because of possible storms."

She looked at him questioningly, as she ended. And saw that he was shaking his head, gravely:

"I'm afraid," he said, "it's not so simple as that. Those bright point-replicas of suns look the size of peas due to light distortion, but when examined through a metroscope they show only a few molecules in diameter. If that is their proportion to the suns they represent—"

She had learned in genuine crises to hide her feelings from subordinates. She stood now, inwardly stunned, outwardly cool, thoughtful, calm. She said finally:

"You mean each one of those suns, their suns, is buried among about a thousand other suns?"

"Worse than that. I would say that they have only inhabited one system in ten thousand. We must never forget that the Lesser Magellanic Cloud is a universe of fifty million stars. That's a lot of sunshine."

The old man concluded quietly: "If you wish, I will prepare orbits involving maximum speeds of ten light days a minute to all the nearest stars. We may strike it lucky."

The woman shook her head savagely: "One in ten thousand. Don't be foolish. I happen to know the law of averages that relates to ten thousand. We would have to visit a minimum of twenty-five hundred suns if we were lucky, thirty-five to fifty thousand if we were not.

"No, no"—a grim smile compressed her fine lips—"we're not going to spend five hundred years looking for a needle in a haystack. I'll trust to psychology before I trust to chance. We have the man who understands the map, and while it will take time, he'll talk in the end."

She started to turn away, then stopped. "What," she asked, "about the building itself? Have you drawn any conclusions from its design?"

He nodded. "Of the type used in the galaxy about fifteen thousand years ago."

"Any improvements, changes?"

"None that I can see. One observer, who does all the work. Simple, primitive."

She stood thoughtful, shaking her head as if trying to clear away a mist.

"It seems strange. Surely after fifteen thousand years they could have added something. Colonies are usually static, but not that static."

She was examining routine reports three hours later when her astro clanged twice, softly. Two messages—

The first was from Psychology House, a single question: "Have we permission to break the prisoner's mind?"

"No!" said Grand Captain Laurr.

The second message made her glance across at the orbit board. The board was aglitter with orbit symbols. That wretched old man, disobeying her injunction NOT to prepare any orbits.

Smiling twistedly, she walked over and studied the shining things, and finally sent an order to Central Engines. She watched as her great ship plunged into night.

After all, she thought, there was such a thing as playing two games at the same time. Counterpoint was older in human relations than it was in music.

The first day she stared down at the outer planet of a blue-white sun. It floated in the darkness below the ship, an airless mass of rock and metal, drab and terrible as any meteorite, a world of primeval canyons and mountains untouched by the leavening breath of life.

Spy rays showed only rock, endless rock, not a sign of movement or of past movement.

There were three other planets, one of them a warm, green world where winds sighed through virgin forests and animals swarmed on the plains.

Not a house showed, nor the erect form of a human being.

Grimly, the woman said into the intership communicator: "Exactly how far can our spy rays penetrate into the ground?"

"A hundred feet."

"Are there any metals which can simulate a hundred feet of earth?"

"Several, noble lady."

Dissatisfied, she broke the connection. There was no call that day from Psychology House.

The second day, a giant red sun swam into her impatient ken. Ninety-four planets swung in their great orbits around their massive parent. Two were habitable, but again there was the profusion of wilderness and of animals usually found only on planets untouched by the hand and metal of civilization.

The chief zoological officer reported the fact in his precise voice: "The percentage of animals parallels the mean for worlds not inhabited by intelligent beings."

The woman snapped: "Has it occurred to you that there may have been a deliberate policy to keep animal life abundant, and laws preventing the tilling of the soil even for pleasure?"

She did not expect, nor did she receive, an answer. And once more there was not a word from Lieutenant Neslor, the chief psychologist.

The third sun was farther away. She had the speed stepped up to twenty light days a minute—and received a shocking reminder as the ship bludgeoned into a small storm. It must have been small because the shuddering of metal had barely begun when it ended.

"There has been some talk," she said afterward to the thirty captains assembled in the captains' pool, "that we return to the galaxy and ask for an expedition that will uncover these hidden rascals.

"One of the more whining of the reports that have come to my ears suggests that, after all, we were on our way home when we made our discovery, and that our ten years in the Cloud have earned us a rest."

Her gray eyes flashed; her voice grew icy: "You may be sure that those who sponsor such defeatism are not the ones who would have to make the personal report of failure to his majesty's government. Therefore, let me assure the faint hearts and the homesick that we shall remain another ten years if it should prove necessary. Tell the officers and crew to act accordingly. That is all."

Back in the main bridge, she saw that there was still no call from Psychology House. There was a hot remnant of anger and impatience in her, as she dialed the number. But she controlled herself as the distinguished face of Lieutenant Neslor appeared on the plate. She said then:

"What is happening, lieutenant? I am anxiously waiting for further information from the prisoner."

The woman psychologist shook her head. "Nothing to report."

"Nothing!" Her amazement was harsh in her voice.

"I have asked twice," was the answer, "for permission to break his mind. You must have known that I would not lightly suggest such a drastic step."

"Oh!" She had known, but the disapproval of the people at home, the necessity for accounting for any amoral action against individuals, had made refusal an automatic action. Now— Before she could speak, the psychologist went on:

"I have made some attempts to condition him in his sleep, stressing the uselessness of resisting Earth when eventual discovery is sure. But that has only convinced him that his earlier revelations were of no benefit to us."

The leader found her voice: "Do you really mean, lieutenant, that you have no plan other than violence? Nothing?"

In the astroplate, the image head made a negative movement. The psychologist said simply:

"An 800 I. Q. resistance in a 167 I. Q. brain is something new in my experience.

The woman felt a great wonder. "I can't understand it," she complained. "I have a feeling we've missed some vital clue. Just like that we run into a weather station in a system of fifty million suns, a station in which there is a human being who, contrary to all the laws of self-preservation, immediately kills himself to prevent himself from falling into our hands.

"The weather station itself is an old model galactic affair, which shows no improvements after fifteen thousand years; and yet the vastness of the time elapsed, the caliber of the brains involved suggest that all the obvious changes should have been made.

"And the man's name, Watcher, is so typical of the ancient pre-spaceship method of calling names on Earth according to the trade. It is possible that even the sun, where he is watching, is a service heritage of his family. There's something—depressing—here somewhere that—"

She broke off, frowning: "What is your plan?" After a minute, she nodded. "I see . . . very well, bring him to one of the bedrooms in the main bridge. And forget that part about making up one of our strong-arm girls to look like me. I'll do everything that's necessary. Tomorrow. Fine."

Coldly she sat watching the prisoner's image in the plate. The man, Watcher, lay in bed, an almost motionless figure, eyes closed, but his face curiously tense. He looked, she thought, like someone discovering that for the first time in four days, the invisible force lines that had bound him had been withdrawn.

Beside her, the woman psychologist hissed: "He's still suspicious, and will probably remain so until you partially ease his

mind. His general reactions will become more and more concentrated. Every minute that passes will increase his conviction that he will have only one chance to destroy the ship, and that he must be decisively ruthless regardless of risk.

"I have been conditioning him the past ten hours to resistance to us in a very subtle fashion. You will see in a moment . . . ah-h!"

Watcher was sitting up in bed. He poked a leg from under the sheets, then slid forward, and onto his feet. It was an oddly powerful movement.

He stood for a moment, a tall figure in gray pajamas. He had evidently been planning his first actions because, after a swift look at the door, he walked over to a set of drawers built into one wall, tugged at them tentatively, and then jerked them open with an effortless strength, snapping their locks one by one.

Her own gasp was only an echo of the gasp of Lieutenant Neslor.

"Good heavens!" the psychologist said finally. "Don't ask me to explain how he's breaking those metal locks. Strength must be a by-product of his Dellian training. Noble lady—"

Her tone was anxious; and the grand captain looked at her. "Yes?"

"Do you think, under the circumstances, you should play such a personal role in his subjection? His strength is obviously such that he can break the body of anyone aboard—"

She was cut off by an imperious gesture. "I cannot," said the Right Honorable Gloria Cecily, "risk some fool making a mistake. I'll take an antipain pill. Tell me when it is time to go in."

Watcher felt cold, tense, as he entered the instrument room of the main bridge. He had found his clothes in some locked drawers. He hadn't known they were there, but the drawers aroused his curiosity. He made the preliminary Dellian extra energy movements; and the locks snapped before his super strength.

Pausing on the threshold, he flicked his gaze through the great domed room. And after a moment his terrible fear that he and his kind were lost, suffered another transfusion of hope. He was actually free.

These people couldn't have the faintest suspicion of the truth. The great genius, Joseph H. Dell, must be a forgotten man on Earth. Their release of him must have behind it some plan of course but—

"Death," he thought ferociously, "death to them all, as they had once inflicted death, and would again."

He was examining the bank on bank of control boards when, out of the corner of his eyes, he saw the woman step from the nearby wall.

He looked up; he thought with a savage joy: The leader! They'd have guns protecting her, naturally, but they wouldn't know that all these days he had been frantically wondering how he could force the use of guns.

Surely to space, they *couldn't* be prepared to gather up his component elements again. Their very act of freeing him had showed psychology intentions.

Before he could speak, the woman said, smilingly: "I really shouldn't let you examine those controls. But we have decided on a different tactic with you. Freedom of the ship, an opportunity to meet the crew. We want to convince you . . . convince you—"

Something of the bleakness and implacableness of him must have touched her. She faltered, shook herself in transparent self-annoyance, then smiled more firmly, and went on in a persuasive tone:

"We want you to realize that we're not ogres. We want to end your alarm that we mean harm to your people. You must know, now we have found you exist, that discovery is only a matter of time.

"Earth is not cruel, or dominating, at least not any more. The barest minimum of allegiance is demanded, and that only to the idea of a common unity, the indivisibility of space. It is required, too, that criminal laws be uniform, and that a high munimum wage for workers be maintained. In addition, wars of any kind are absolutely forbidden.

"Except for that, every planet or group of planets, can have its own form of government, trade with whom they please, live their own life. Surely, there is nothing terrible enough in all this to justify the curious attempt at suicide you made when we discovered the weather station."

He would, he thought, listening to her, break her head first. The best method would be to grab her by the feet, and smash her against the metal wall or floor. Bone would crush easily and the act would serve two vital purposes:

It would be a terrible and salutary warning to the other officers of the ship. And it would precipitate upon him the death fire of her guards.

He took a step toward her. And began the faintly visible muscle and nerve movements so necessary to pumping the Dellian body to a pitch of superhuman capability. The woman was saying:

"You stated before that your people have inhabited fifty suns in this space. Why only fifty? In twelve thousand or more years, a population of twelve thousand billion would not be beyond possibility."

He took another step. And another. Then knew that he must speak if he hoped to keep her unsuspicious for those vital seconds while he inched closer, closer. He said:

"About two thirds of our marriages are childless. It has been very unfortunate, but you see there are two types of us, and when intermarriage occurs as it does without hindrance—"

Almost he was near enough; he heard her say: "You mean, a mutation has taken place; and the two don't mix?"

He didn't have to answer that. He was ten feet from her; and like a tiger he launched himself across the intervening gap.

The first energy beam ripped through his body too low down to be fatal, but it brought a hot scalding nausea and a dreadful heaviness. He heard the grand captain scream:

"Lieutenant Neslor, what are you doing?"

He had her then. His fingers were grabbing hard at her fending arm, when the second blow struck him high in the ribs and brought the blood frothing into his mouth. In spite of all his will, he felt his hands slipping from the woman. Oh, space, how he would have liked to take her into the realm of death with him.

Once again, the woman screamed: "Lieutenant Neslor, are you mad? *Cease fire!*"

Just before the third beam burned at him with its indescribable violence, he thought with a final and tremendous sardonicism: "She still didn't suspect. But somebody did; somebody who at this ultimate moment had guessed the truth."

"Too late," he thought, "too late, you fools! Go ahead and hunt. They've had warning, time to conceal themselves even more thoroughly. And the Fifty Suns are scattered, scattered among a million stars, among—"

Death caught his thought.

The woman picked herself off the floor, and stood dizzily striving to draw her roughly handled senses back into her brain. She was vaguely aware of Lieutenant Neslor coming through a transmitter, pausing at the dead body of Gisser Watcher and rushing toward her.

"Are you all right, my dear? It was so hard firing through an astroplate that—"

"You mad woman!" The grand captain caught her breath. "Do you realize that a body can't be reconstituted once vital organs have been destroyed. Dissolution or resolution cannot be piecemeal. We'll have to go home without—"

She stopped. She saw that the psychologist was staring at her. Lieutenant Neslor said:

"His intention to attack was unmistakable and it was too soon according to my graphs. All the way through, he's never fitted anything in human psychology.

"At the very last possible moment I remembered Joseph Dell and the massacre of the Dellian supermen fifteen thousand years ago. Fantastic to think that some of them escaped and established a civilization in this remote part of space.

"Do you see now: "Dellian—Joseph M. Dell—the inventor of the Dellian perfect robot."

FOUR LITTLE SHIPS

By MURRAY LEINSTER

An old favorite of science-fiction back again with an ingenious tale of little ships and special gadgets—ordinary sorts of gadgets—and a naval victory that didn't need battleships or planes or air carriers. Just—ingenuity and planning, plus four little ships.

THIS is the story of four little ships in war time. They were the *Heron* and the *Tanager* and the *Gannet* and the *Thrush.* They were mine sweepers and, therefore, neither pretty to look at nor romantic to contemplate. They went down to Kaua from Pearl Harbor without escort of planes, despite the enemy's long-range bombers and similar stratagems, and on the way they ran into a storm which was the Pacific at its most belligerent. For four days nobody on board got any sleep except holding on to something, and nobody got any rest at all. Then they reached Kaua and found themselves in a beautiful predicament with all the rest of the American squadron there. The predicament had developed swiftly.

As late as Monday, the 6th, affairs in the Kaua combat area had seemed nicely and comfortably stalemated. There were three ancient American cruisers at Kaua, with four destroyers and a fuel tanker. Their function was the protection of American commerce in the southern Pacifice, with especially watchful attention to the enemy base at Mahapa, which was exactly seventy miles as the crow flies from Kaua's observation point. On the same date the enemy was believed to have one fleet submarine and three destroyers—one of them pretty well battered—behind the mine fields and heavy guns of Mahapa.

On Tuesday, though, a battered native canoe capsized in the surf off Kaua's southernmost tip, and a native swam ashore to sob his hatred of the enemy's whole race, and to add that two monstrous enemy battleships had sneaked down under cover of the recent storm which had pretty well ended all commerce-raiding in these parts. That same afternoon a plane from one of the antique cruisers verified the information, and added that the newcomers were the *Michinoku* and and the *Chuijo*—monster ships built in deep secrecy and flat violation of the Washington Agreement. They were rated at thirty-five thousand tons apiece and carried twelve sixteen-inch guns.

On Wednesday morning the four small and storm-battered mine sweepers—the *Heron,* the *Tanager,* the *Gannet* and the *Thrush*—limped into Kaua Harbor and discovered what they and the rest of the squadron were up against.

The enemy battleships, of course, were incomparably stronger than all the American ships together. The biggest American guns were the eight-inch batteries of the cruisers. And the Americans were not only outclassed in armament—they could be outrun. The destroyers might leave the superbattleships behind in a stern chase, but the cruisers hadn't a prayer. The purpose of the enemy movement was simply to pull the main American fleet out of Pearl Harbor for a game of hide-and-seek. He had a plan in mind which made it necessary. But pending the game's beginning, the squadron at Kaua was cold meat for the monsters and they could be expected to come over any day to dine. The Americans could surrender—which was not thinkable—or they could abandon Kaua and scatter in flight—which nobody considered—or they could wait for the enemy attack and then fight valorously with guns which could not range to the huge ships' side armor, nor penetrate it if they struck. Until the four little ships arrived the Kaua squadron seemed to have no other choice. Their coming changed the picture a little. Their armament, to be sure, consisted only of a six-pounder each and a few anti-

aircraft machine guns, but in the American predicament anything would count. The four little ships counted a great deal.

Just before sunset on Wednesday the four mine sweepers steamed out of Kaua Harbor and headed west. Darkness fell swiftly behind them. They were less than ten miles on their way toward a mine field guarding Mahapa when droning, roaring things came plunging down out of the night to land in Kaua Harbor in their rear. There were not many planes. The navy had only so many with the range to reach Kaua from Pearl Harbor, and of that number they could spare only a few. But those planes came down and refueled. One hour after alighting they took off for combat service. The four mine sweepers heard them overhead on their way to Mahapa. They flew so high that the sound of their motors was a thin and peevish drone. The mine sweepers went on and the sound of the bombers dwindled and died. But presently there came faint flashes below the horizon, and once or twice dull sounds which might have been explosions.

The mine sweepers reached their appointed place, the long and ragged Challoner Bank. The Pacific Pilot said that the Challoner Bank was 15° 32′ N. and 147° 50′ East, extending nearly fifty miles in a northerly and southerly direction, sprinkled with reefs, and with a greatest depth between of not more than twenty fathoms. The Americans knew that where reefs didn't bar all passage the enemy had made it a mine field. It was a perfect first line of defense for Mahapa. Each mine sweeper broke out a sweep—a hundred and fifty fathoms of steel cable with a paravane at the end—and sturdily began to plow backward and forward in the darkness. Presently there was a monstrous, booming concussion. Then another. Mines.

Down below the horizon, momentary flashes looked somewhat like pale heat lightning. But it was air bombs—heavy ones. The mine sweepers paid no attention. They were busy. From time to time the heavy, booming sound of a detonating mine arose from the Challoner Bank. Then buzzings began overhead. A flare blossomed in the sky. The mine sweepers plowed on their way. The buzzings grew louder and became roars. Streaks of colored sparks darted up from one mine sweeper and then from another. Sharp, cracking detonations told of bombs dropped upon them as targets. They went on, firing their machine guns with complete futility. Then other buzzings came down from higher overhead and the bombing stopped, while the star-studded sky filled with crazy sounds of roaring things in lunatic gyrations. Now and again there were tiny spittings in the sky, like miniature showers of shooting stars. Twice, flaming yellow objects fell insanely into the sea.

The mine sweepers methodically went on with their work. Now and again—not often—there came the heavy, shattering detonation of a mine. Toward dawn the noises in the sky diminished. When dawn actually came, the four little ships were heading back toward Kaua. Nothing of any importance seemed to have happened.

Nothing happened all day Thursday. The mine sweepers lay stolidly at anchor. The American squadron lay still in Kaua Harbor, baking somnolently in a glaring, white-hot sun. The palms on the island let their fronds droop discouragedly. The surf boomed languidly on the beaches. The only activity anywhere was the planes, which buzzed continually above the island. Now and again one of them darted away toward Mahapa, and now and again another came back. But there was no gunfire of any sort. The enemy did not appear to attack Kaua. Nobody knew why. The Americans did not move to attack Kaua. Everybody knew the reason for that. Nothing happened anywhere, but a battle was definitely in prospect.

The enemy was sure of it because the four little ships had swept channels leading through the mine field on Challoner Bank. It did not make sense of course. The American ships were outclassed in guns, armor, speed, and size by the *Michinoku* and *Chuijo*. But the mine sweepers would not have swept and buoyed two channels through the mine field save for the purpose of attack. It could not succeed, of course. The Americans could not even flee with any real hope of escape. It looked as if the squadron at Kaua, knowing itself doomed, planned to go down in a daring, desperate assault upon the enemy, in which the three ancient cruisers would throw themselves away to try to get a chance for a torpedo attack on the big ships. The enemy could not quite believe in such an intention, but all other explanations were improbable, too.

The four little ships lay at anchor all day

Thursday. Toward sunset they steamed out once more and again went wallowing through the long smooth swells to westward. They were heavily built and solid small craft with the engines of powerful tugs and the stolid, purposeful appearance of so many scrub women. They neared the Challoner Bank and small enemy surface craft ran away. They certainly did not run from the mine sweepers out of fear. None of them mounted anything bigger than a six-pounder. But they ran away, nevertheless, in the newly fallen night.

The four small ships' searchlights flashed briefly. They found the buoys they had planted the night before, marking two clear channels through the mine field. The four mine sweepers methodically smashed those buoys. Because, of course, the buoys had been cut loose from their original moorings by the enemy small craft, and humorously reanchored where there was no channel at all. The mine sweepers then painstakingly swept again through the channels they had cleared the night before. And at irregular intervals during the next half-hour there were monstrous, booming detonations.

They went painstakingly about their business. They were fitted with various devices for their work besides the sweeps. One device had been developed from the electrical contrivances by which public-service companies locate buried gas and water mains. It was an induction finder, and instead of finding water pipes it made chirping noises where a sweep passed over a mine. Another was a variation of the road signs which warn motorists of curves on a highway at night. Yet another had originally been used in prospecting for petroleum, and a fourth was practically nothing but a glorified automobile horn, operating under water. None of them was glamorous.

For a long, long while they moved back and forth upon the Challoner Bank which the enemy had so carefully strewn with mines. There was not a single explosion more. Nothing happened. Nothing happened at all.

But then, out of the darkness, black shapes came boring swiftly from Kaua. They were the American ships, sooted to near-invisibility in the night by submergence in smoke clouds especially generated for the purpose. The mine sweepers did not halt in their task. The American squadron moved very swiftly and very quietly through the channels the mine sweepers had made. It went beyond the mine field and turned sharply north to approach Mahapa from the least probable direction.

The four little ships kept on with their work. They moved with a fair speed, strung out in echelon; the *Heron*, the *Tanager*, the *Gannet* and the *Thrush* in line oblique, each towing a long sweep cable at an angle over its side. These sweeps, however, were not deeply sunk. They trailed barely below the surface and they were lighter and thinner than a sweep designed actually to uproot mines from the ocean floor. The four little ships gained knots in speed by the substitution. And the device which had originally been used to locate buried gas and water pipes now functioned busily. Loud-speakers chirped alertly in notes of diverse pitch, telling the location of mines. And little catapults on the sterns of the mine sweepers came into play, flinging slender rods with bulbous excrescences at their ends for different distances out over the water.

The rods had developed from the road signs that mark curves on highways. Each was a slender pole which would float upright in the water. The bulbous thing was an anchor with a length of fine line. When a chirping sound located a mine, a harmless missile splashed into the water above it, and its anchor twisted down, while the pole floated with nearly eight feet of its length out of water. It was undetectable in the darkness unless one knew. The trick of it was the road sign. The tip of each rod contained four cat's-eye mirrors, lightless and normally unseen. Yet a winking light sent across the waters would be reflected with uncanny accuracy back to its point of origin, in so narrow a beam that one had to use a combined light and binoculars to find it. And the reflected beam was colored red. It could not be confused with a wave reflection.

For almost an hour after the fleet's passage the mine sweepers went about their work undisturbed. Then planes went by overhead. They came from Kaua. Only minutes later there were again the distant flashes—below the horizon line—of monster explosions at Mahapa.

At Mahapa there was battle and carnage and sudden death. Planes grappled furiously ten thousand feet above the earth. One American destroyer flung itself into a desperate plunge across the harbor mouth, shedding floating mines in a steady stream astern, and flinging them crazily in intricate

patterns from its depth-charge catapults. Floating mines are unanchored, free-floating, deadly things, kept at set depth by tiny motors. For a certain minimum time—until the current carries them away—they make any area in which they are sown unnavigable. The cruisers lobbed their eight-inch shells over the outer rim of land into the inner harbor. Three torpedo planes flashed down and were illuminated starkly by the flare of a monstrous explosion, and one of them went to pieces as an antiaircraft shell hit it squarely. Bombs dropped and searchlights probed fiercely upward, and the heavy guns of the shore forts opened a furious fire while the destroyers laid thick and opaque smoke screens to shield the cruisers, and flung their own four and six-inch shells into the harbor, too.

It was not suicide by the American squadron. It was a raid. But the result should be the same. The *Michinoku* and the *Chuijo* were collosi. Given destroyer protection against torpedoes, they should be invulnerable. When they came out—

Parachute flares flared bleakly in the sky. The crazily racing American destroyer, sowing floating mines to cover the dash-away of the American fleet, vanished in a monstrous heap of spouting spray and flaming gases. When the smother subsided the destroyer would be seen with its afterpart gone to the water's edge, trying to drag itself away from the scene of disaster like a partially crushed insect.

It was time for the raid to end. The American ships shed more clusters of floating mines to deter pursuit, and moved swiftly away in the blackness. Smoke swirled behind them. They vanished, only the flashes of their guns firing sternward testifying that they continued to exist.

There was only air combat above Mahapa. Zooming, booming planes still careened madly through the night beneath the stars. Bombing ceased while the American planes tried to keep all enemy planes too busy to track down the fleeing squadron. But scout planes quested the sea regardless, and the Americans devoted themselves to savage attacks, and dogfights took place miles out at sea in every direction.

Inside the harbor, the *Michinoku* and the *Chuijo* chafed. Their own mine sweepers went out to see what could be done about clearing the harbor entrance. One of them, barely out of the narrows, rose skyward in dissolving fragments atop a two-hundred-foot column of spume. But the others went on gingerly. The ocean current past Mahapa would take care of the floating mines in time. But time was precious. If the monster battleships could take up the chase before too long, they could overtake the ancient American cruisers long before they could win back to Kaua. And if they overtook them they would annihilate the lesser ships.

They came out—and the cruisers had been located. Their fiery, phosphorescent wakes had been sighted by a scout plane which relayed the information before two American fighters shot it down. The *Michinoku* and the *Chuijo* headed for their prey. They were huge. They were monstrous. They were stripped and streamlined and terrible. They hurled themselves through the water at thirty-five knots to wipe out the squadron which had dared to beard them in their lair. The whole ocean seemed to throb with the power of their rush to kill.

On the Challoner Bank the four little ships steamed soberly about their business. They swept across the width of the mine field, and loudspeakers made chirping, or clucking, or thumping noises, and slender rods went arcing through dark air to splash phosphorescently when they touched the water. And presently an almost-invisible stick floated close by an anchored mine and supported little mirrors—developed for road signs—which reflected only darkness.

Once, and only once—it was their sole active contribution to the actual fighting—the little ships broke their routine. That was when a little blue light glowed on the *Heron*, and a special sounder made a moaning, keening noise. A quick signal passed among the four little ships. The moaning noise spoke of the presence of a mass of steel too huge to be a mere mine casing. It could only be the enemy's one fleet submarine, patrolling dark waters because of its commander's thirst for glory. It had heard the engines of the mine sweepers and it drew near to fire torpedoes at the sound.

The four little ships simultaneously made noises under water. They used their submarine sounders, adapted from the design of automobile horns. Those sounders were made to detonate acoustic mines, which are planned to be exploded by the noise of ships' engines. But acoustic mines are now so designed that a sudden sound, too loud, makes them insensitive.

The four ships made a raucous racket

underneath the waves. A confused, a wailing, a tumultuous racket in which each ship varied pitch and volume in such a bedlam of sound that the nearby fishes fled dizzily from the spot. But the submarine—which saw through its ears—was bewildered by the blast of noise. Its delicate microphones were jammed and blasted. It essayed to move silently away from the uproar which made its instruments read sheer gibberish. But the speed of even a fleet sub is limited when submerged. The four little ships could more than match it, and they were not using any listening device. They had detected it and they now broke echelon and closed in on it because of the effect of its metal mass upon instruments originally planned to locate gas mains.

Presently there were explosions under water, Depth bombs, which heaved up monstrous masses of sea and pitched the four mine sweepers crazily about. But the keening, moaning noise of the submarine in the submarine inductance indicator went down and down and down in pitch. The submarine was sinking lower—and the Challoner Bank gives abruptly upon deep water. When the sub was at least four hundred fathoms down the four little ships arranged themselves in echelon again and went back to their methodical criss-crossing of the Challoner Bank. They knew the sub would not come up again because four hundred fathoms is over two thousand feet.

The long swells came monotonously from southeast. The mine sweepers kept on with their equally monotonous task. They did not even swerve from their courses when out of the darkness there came the flashes of gunfire. Not even when they saw the terrible flares which denote the firing of sixteen-inch guns.

The sooted ships of the American squadron came hurtling out of the darkness and plunged into the mine field. From the bow of each ship came flickering, none-too-vivid winkings of light. From time to time small guns coughed rackingly over their bows. The guns were small ones—four-pounders at most. Each shot was followed by a detonation which sounded like about a pound of high explosive going off under water. Which was exactly what it was.

The American fleet restricted itself to those wide lanes the mine sweepers had marked with their slender rods and cat's-eye mirrors. And it moved in safety through the mine field—even bumping iron cases loaded with annihilation—by the simple process of firing tiny depth charges before it. Because every mine is protected against a chain explosion by a device which desensitizes it when a concussion wave strikes, the cat's-eye-mirrored buoys made it practical for each ship to neutralize any mine it approached by firing a depth shell to operate that mechanism. But the mines returned to live and deadly state within two minutes.

The mine sweepers did not join the fleet in flight. They stayed on at their task. Aircraft joined battle overhead. Parachute flares sprayed pitiless light upon the water. Far, far away, two monstrous detonations sounded, and the American squadron turned as if at bay, and its guns opened up again in the seeming of futile and pitiful defiance. They gave the exact appearance of ships which had been cornered and driven into the mine field on the Challoner Bank, and which had discovered the fact when the mines took toll.

The enemy fleet raged forward magnificent. Finer navigation, perhaps, would have warned its crews, but Pacific currents are varied and swift, and a racial inferiority complex does not lead to discretion in a moment of overwhelming triumph. It appeared that the American squadron had essayed a raid; had been cornered in its flight; and that it now stood pitifully at bay with a mine field behind it and the overwhelming might of two superbattleships coming up to batter it to scrap iron.

The huge guns of the *Michinoku* and the *Chuijo* fell scornfully silent. They swept on at thirty-five knots in the obvious, wrathful determination to finish this action by direct fire. American flares lighted them as their own flares played upon the American ships. Shell spouts rose near them. American shells, fired in seeming hopelessness. But—

A destroyer, racing a bare hundred yards from the *Michinoku* buckled suddenly and its bow dived under water while its afterpart reared upward on a mountain of water sprouting below it. Something struck the *Chuijo* an incredible blow. It reeled and swung in a wide arc out of position, and almost overran one of its own destroyers. The destroyer flung over its helm in panic, and its whole stern vanished in a sheet of lurid flame. Another destroyer to starboard hit something and its torpedoes went off in a series of winking flashes which seemed to

rock the Universe. Then the *Michinoku* struck.

The chase ended at that instant. The two superbattleships did not go down at once. But they were crippled and they were trapped. Their skippers must have thought at first that they had run into a floating mine field of the Americans' sowing. But then their depth finders told them the truth. They were among their own mines on the Challoner Bank, and to all intents and purposes they were doomed.

The *Michinoku* threw her engines into full speed astern and the *Chuijo* did the same. If they could stop and anchor, and if sweeps could be improvised quickly enough, they might yet live until trawlers from Mahapa could clear a way out of this for them. Even anchored and unmaneuverable they would be a match for ten times the American force.

But even that humiliating resource was denied them. American planes came diving in. Smoke screens had to be made for protection against torpedo attack—and two destroyers died while making them, upon mines compatriots had laid. The *Chuijo*, its steerageway almost gone, hastily dropped an anchor and it scraped a bottom-anchored mine which blew away the anchor and twenty feet of the *Chuijo's* bow.

And the American ships came back. They could have gone quietly back to Kaua with the superbattleships out of action for weeks or months to come. But they came back. Sooted and stern and savagely battered, they returned for the kill. They still were far outmatched. Their antiaircraft guns were busy, and their own aircraft fought savagely above them, but they came in. The air about the big ships was murky, almost opaque. Ragged streamers of oily vapor covered the sea in inextricable confusion for a space of miles. Into that crisscross of obscurity the ships from Kaua plunged once more. They moved by dashes and darts and turnings, following the crisscross lanes in which all mines were marked by buoys the enemy could not see. To the enemy, their courses were unpredictable. One of the cruisers sank an enemy destroyer at six hundred yards, coming upon it out of suffocating smoke. Point-blank fire from eight-inch guns shattered the destroyer before a torpedo tube could be aimed.

The *Michinoku* overrode her anchors and tripped upon a second mine, and then an American destroyer came out of nowhere and startledly let go two torpedoes and got away without a shot fired at her, and the *Chuijo* drifted helplessly upon a nest of mines which let go one after another—

Two enemy destroyers got back to Mahapa out of all the enemy fleet, and neither of them was in shape to offer battle for a long while to come. When dawn broke the American cruisers were picking up life rafts to which hordes of sodden figures clung hopelessly. The fighting tops of the *Michinoku* still stood above the water. She had sunk in fifteen fathoms and very nearly on an even keel. A group of officers fought with small arms from those utterly untenable positions until an American destroyer opened up a machine gun. They had tried to destroy or dismount certain range-finding devices in the fighting tops, and failing to do so had died to protect their nations secrets. The Americans, examining the mechanisms, found them inferior and did not trouble to salvage them. Then the American fleet steamed back to Kaua, leaving the four mine sweepers to pick up the hundreds of floating sticks they had strewn the night before, and to clean up the mess generally.

It was a great victory. American newspapers published pæans of triumph under hundred-and-twenty-point heads, and the crews of the ancient cruisers and the surviving destroyers were heroes and would be famous for years to come. Even the air force came in for its share of praise. Two superbattleships and a destroyer escort wiped out by an American squadron of one third the tonnage and one twentieth the gun power.

But the four little ships: the *Heron* and the *Tanager* and the *Gannet* and the *Thrush*—well, it was not expedient to praise them too highly. After all, the enemy still didn't know what had happened. To reveal too much of the mine sweepers' share would be to give the enemy valuable information. The devices that had won the victory were strictly hush-hush. So the official accounts did not mention them.

Two weeks after the battle the four little ships were ordered back to Pearl Harbor.

IT'S A TOUGH LIFE

By FRANK BELKNAP LONG

But some of the forms of life have developed toughness—and camouflage—to match. Frogs you can walk on without killing 'em—

ABOUT two years ago L. Sprague de Camp startled, delighted and/or seriously disturbed the readers of Astounding Science-Fiction with an article that has haunted the present writer like a misplaced laundry ticket. If there is one thing a science-fiction author prides himself on, it is the whacky character of his imagination. "Peopling" the Solar System with bizarre and fantastic animals is his prerogative.

He can't be stopped by anything short of a priority ruling from going to town in that respect, and woe to the scrivener who thinks otherwise. Be he a disinterested scholar and gentleman like Sprague de Camp, or just a run-of-the-mill scrivener with an ax to grind —woe to him!

For two years now I have been brooding over Sprague de Camp's article, which was labeled: "There Ain't No Such." Buttressed by an erudition surpassing anything I can hope to muster, De Camp made the wild life of Mars, Venus and the great outer planets seem utterly prosaic by dishing up a few choice titbits of *sober natural history*.

"Inebriate" would perhaps be a better word for it, for there is nothing sober about Dame Nature when she lets go with cross-eyed planarian worms which can reproduce by simply dragging themselves over muddy river bottoms, and shrimps that look like something out of "The War of the Worlds."

Being a top-flight science-fiction writer himself, De Camp should have known better than to deprive his fellow-scriveners of their bread and beer. If he hadn't tattled, very few people would have suspected that "there are animals on Earth so completely haywire that not even an author of fiction would try to make them believable."

In appending that charitable by-line to Sprague's article, the editor of Astounding Science-Fiction was doubtless aware that he was indulging in an understatement. But —well, his desire to spare so brilliant a contributor snubs and reprisals from every science-fiction author in the business was understandable enough.

Fortunately I am bound by no such scruples. After two years of brooding over Sprague's dastardly attempt to cut off his nose to spite his face, I have decided to do something about it.

While I am reluctant to emulate in any way the bloodthirsty little yellow monkeys which are at present swarming all over the Pacific, I have decided to heap coals of fire on Sprague's head by committing hara-kiri on his very doorstep.

There are times when one can profitably take a leaf from the jungle, and Sprague has left me no choice. Earth, as he has pointed out, can show some pretty queer organisms, and facts are facts. And since I am unable to refute his solidly documented claims, my only alternative is to completely cart away a structure which he has nine-tenths toppled, and left a smoking mass of rubble. I am referring, of course, to the science-fictioneer's House of Wonders.

In "There Ain't No Such" Sprague has brilliantly discussed the unbelievably fantastic life histories of a *few* terrestrial animals. I stress the "few" because nonconformity is so savagely penalized by Dame Nature that only a scattered handful of living creatures have the guts to hew a path which will expose them to ridicule.

But, anyhow, Sprague has laid a great deal of colorful stress on the outlandish shapes and locomotive idiosyncrasies of his water skaters, ichneuman flies and snakes. He has emphasized that the wild life of Mars and Venus can't hold a candle to the fauna of Earth in the matter of environmental acrobatics. But when we now utterly discredited science-fictioneers put a bizarre whatizit? on a satellite of Jupiter and call it a sulphur-eating pupapompus, what is the first test we apply to it?

You've guessed it. We ask ourselves is it predominantly a tough customer—can it survive all hazards? If it can make lovely waste motions and break out in a rash of cranes, derricks and projecting lenses like one of Eric Russell's Mechanistrians, so much the better. But what we are primarily interested in is its ability to *stand the gaff.*

Can it be roughed? Can it be pushed around? It's a tough life form that survives because it will eventually be confronted by Second Stage Lensmen, and other formidable engines of destruction.

"Well, now," I can hear you saying, "You don't have to commit hara-kiri. There are certainly no animals on Earth as tough as the ones you science-fictioneers pull out of your belfries, so to speak."

Far-from-gentle reader, that's what *you* think. De Camp may have but cursorily skirted that aspect of his subject—cf. his reference to a mold which lives in concentrated sulphuric acid, and a bug which goes skating in the middle of the Atlantic Ocean—but if you imagine that terrestrial life can't give fictional life lessons in the art of staying healthy at the bottom of a well, you've another guess coming.

Before inserting the dagger and drawing it solemnly from left to right we may as well lay down a ceremonial mat to kneel on. The mat is elongated and cylindrical and a very slippery customer. It belongs to a group of soft-rayed fishes distinguished by the presence of an opening to the air bladder, and the absence of pelvic fins, and is popularly known as an eel.

The common fresh-water eel, Anguilla, has three habitats. Salt water, fresh water, and the top of a stove. I have personally observed a three-foot eel making itself completely at home in the last-named environment.

It is unquestionably inhumane to put a living eel into a kettle of boiling water and I would shrink from it. But one of my Isaak Waltonish friends is more tough-fibred in that respect. He thinks it improves the flavor or something, and when I strayed into the presence of the eel in question it was too late to do anything about it. He was out of the pot, and wriggling about on a red-hot range.

"Five minutes in boiling water," my friend complained, "and he's still thinking about raising a family."

It shouldn't be hard to kill an eel, of course, since we have now explosives much more powerful than trinitrotoluol. But the salt fly Ephydra is an animal of another color. The salt fly is as black as pitch, and it lays its eggs in salty marshes, and briny inland estuaries. When the eggs hatch you get grubs which can live for upward of an hour in absolute alcohol.

Formaldehyde is a chill, cadaveric chemical, and I wouldn't want to put my thumb in a ten percent solution, and screw on the cap. But the salt fly grub can swim around in formaldehyde until it breaks out in blisters. Moreover, it doesn't blister easily. It can live for half an hour in a fairly strong solution of carbolic acid, and it can live in vinegar. It could probably survive in sulphuric acid right alongside of De Camp's indestructible mold, but why bring that up?

De Camp had to start with the invertebrates and work up to hop-skip-and-jump snakes in gradual stages, because a scholarly writer can't afford to be too abrupt. But a man on the mat is less inhibited in that respect.

Self-immolation bestows certain privileges, and like it or not, my next exhibit is going to be a frog. He's called Trichobatrachus robustus, and he hails from South Africa. He's the only hairy frog on Earth, but the really astonishing thing about him is that he lives up to his name with a vengeance. So many freakish animals either lack appropriate names, or disgrace the ghost of Linnaeus that it is refeshing to encounter one that doesn't belie its patronymic.

Robustus has to spend hours under water because his natural enemies are no end ferocious. The female burrows in the earth, but the male just flattens himself out at the bottom of a pond, and tries to look like a weed. He doesn't have to try very hard, because he has a fringe of rust-colored hair on his hindlegs and flanks which gives him an "I grow here" look.

But, of course, protective mimicry is old stuff, and African "bird dropping" insects, Malayan leaf insects, and hickory-tough Yankee walking sticks have nine up on Robustus in that respect. What makes Robustus unique is his ability to stay under water for hours at a stretch.

Ordinary frogs can stay under comfortably regardless of their internal structure. They can store up air in their body tissues, and even breathe through their skins. But when you startle a bull-frog at the edge of a pond, and he gives you an exhibition of fancy diving that would throw an athletic

commission into a dither, you don't have to worry about not getting him back.

A little patience will snag him where he sits. Eventually his air supply will grow stale, and he'll pop up out of the mud with his eyes protruding and a "you've got me licked, brother," expression on his mug.

Not so Robustus. He could exhaust the patience of Sisyphus or the Sphinx. He has mastered the art of staying out of sight by taking advantage of the hairs on his hind-limbs and rump.

"Yup," I said "hairs," and if you think there is a catch in it somewhere grab a load of this. The skin of a frog is a sort of flattened-out external lung which pockets oxygen in minute pores from his hindlegs to his snout. Frogs have lungs in their chests, too, of course, but when you're trying to blend with the mud at the bottom of a pond you need plenty of spares.

Robustus has so many spares he doesn't even bother to hold his breath. The hairs which cover him are really elongations of skin, or, if you prefer, epidermal villosities. And while the oxygen-pocketing epidermis of a frog is remarkable enough under ordinary circumstances, when you have hundreds of little points of skin standing out you increase your area of coverage about six thousand percent.

Robustus' skin pockets so much oxygen he doesn't need a bladder-shaped lung in his chest. And what you don't need you seldom get. Instead of a normal lung, Robustus has in his chest a long, thin tube which functions like a bicycle pump. When he thinks that the coast is clear he pumps himself full of air, and up he floats.

He's the shaggiest frog on earth, and the second toughest. The record holder is Pipa Americana—another batrachian with a name that fits him like a glove.

"None so vile" perhaps, but I can't resist pointing out that Pipa Americana is in all respects a pip. He's wafer-thin, and soggy looking, and he reminds you of something else. The first time you meet him you've strayed into a cow pasture, and had better watch your step. You're circling around him in resentment and disgust when you perceive that he is repulsively watching you out of eyes like cracks in a coarse clay jug.

He *looks* shapeless and sluggish, but just try stamping on him. You'll hear a *scrunch,* and fifty feet away a frog with the longest legs you've ever seen will be giving you the merry ha-ha from the top of a water barrel.

To add insult to injury, he is bearded like an old New Bedford whaling captain, and can wriggle his "whiskers" at you.

Even more remarkable in some respects are the batrachians which live high up. In the great rain forests of the Amazon you'll run across tree toads *which have never set foot on Earth.* Millions of big and little toads marooned in a sea of foliage two hundred feet from the ground.

It is certainly no joke to have to live amidst interlacing tendrils and screeching parakeets when you're supposed to spend your formative years in a pool, and want to give your bewildered offspring a watery start in life.

No pool for the little ones, you understand? No moist moss to snuggle under when you're a fledgling toad and haven't quite discovered how to forage for yourself. It's a tough predicament to be in, but the brightly hued parent toad surmounts it by collecting rain water in a pouch on his back.

When the eggs hatch, the tadpoles find themselves in a portable swimming pool—scooped out of the old man's hide, so to speak. No wonder Brazilian tree toads become self-reliant later on in life. They've learned how to survive the hard way, in a cubic inch of swimming space.

There are half a dozen equally stalwart "toughies" in the microsocopic sphere, but the bear animalcule is perhaps the most amazing in that respect. The bear animalcule lives on moist moss in cool woodland glades. It swims around in a little pool in the moss, but when a spell of dry weather shrivels up its lichenous residence, it *doesn't* coil up and die. It just anhydrates itself, and ceases to reproduce.

Picture, if you can, a shrunken microorganism in a state of suspended animation, a dust fleck on dried moss. Picture months and even years going by like parched pelicans, flapping, limping by, while the sun burns steadily down and the air is filled with dust.

Comes the rain. The bear animalcule begins to swell, and grow moist. It rolls over and feels like a pool again. Before you can say "Coma Berenices" it is swimming about again, flapping its cilia, as happy as a day-old chick.

At this point I am warned by a ceremonial tap on the shoulder that my time is up. Steeling myself, I press De Camp's door bell, give the kris a final, upward twist, and topple forward on the mat.

MINUTE AND MIGHTY

THE traditional "bigger and better" is definitely going out the window—particularly in regard to precision instruments of electrical types. All radio "hams," all electronic scientists, are well aware of the basic facts — but there are certain inherent imagination-tickling features in them.

First, and long known, is the fact that there is a very definite mechanical relationship between the wave length radiated by an electrical structure, which means, therefore, frequency of oscillation possible in it, and the physical dimensions of the structure. That applies all the way from the electromagnetic oscillations of radium's gamma rays to the extremely long-wave radio radiation. One of the standard methods of making precise measurements of the oscillation frequency of an ultra-high frequency transmitter depends on that—they measure the wave length of the radiation with a yardstick! The higher the frequency, the shorter the waves, the shorter the wires that *can be used* to handle it—and the shorter the wires *must* be for practical use of the oscillations generated. The apparatus not only can be, but absolutely must be, very small, very compact, its leads and connections extremely short. Even an extra eighth or sixteenth of an inch of lead completely changing the characteristics of the device.

Second, and of more recent date, is the fact that it is almost impossible, and certainly impracticable, to design an amplifier using more than two stages of amplification at any one frequency range in modern, high-gain amplifier tubes. An outfit using two high-gain stages may be tricked up with three, four, or six additional gadget-tubes, such as automatic volume control, inverse feedback, push-pull power amplifier with phase inverter tube, voltage regulator equipment, and a separate four-diode bridge-type full-wave rectifier. But two amplifier stages is about all that can be handled—or is ever needed, because those two stages can give a gain of one hundred thousand to one. It's almost impossible to stabilize an amplifier with that much gain, let alone more. The output leads of such an amplifier will tend to induce minute currents in the input wires, even though they are several inches apart, and shielded behind metal grounding. If so much as 1/100,000th of a volt is induced in the output—the output will reflect its own variations, not the variations the amplifier is intended to work on. The set will, in brief, go into self-excited oscillation, and squeal its silly head off. If a third stage of that high-gain amplification is attempted, it will then take only 1/30,000,000th of a volt of feedback to make it scream senselessly and indefinitely. The best way to prevent that oscillation, I'm told, is to put a switch in the power-supply leads, and turn the thing off.

These two factors, taken together, indicate that radio instruments of the near future not only can be, but darned well have to be, extremely small. Extremely short leads from tube to tube—excellent shielding and superinsulation—enforced small size of parts —immense amplification with only a very few circuit-units. The most efficient type of apparatus, with those things borne in mind, would be a complete radio set, with all its parts, built in and sealed permanently in a single small glass or metal tube.

So—you've read about "magic" jewels? Obviously, they were highly advanced, complete sealed-unit ultra-frequency radio transceivers, not-bigger and better handie-talkie sets. The ring-mounting or bracelet associated with them, clearly, was the tiny, very short aerial that such extreme frequencies must use.

THE EDITOR.

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